

The following catalog
has gaps in its page
numbers, or doesn't
have any numbers.

We have chosen to
leave the page
numbering in the
order that Acrobat
assigns it.

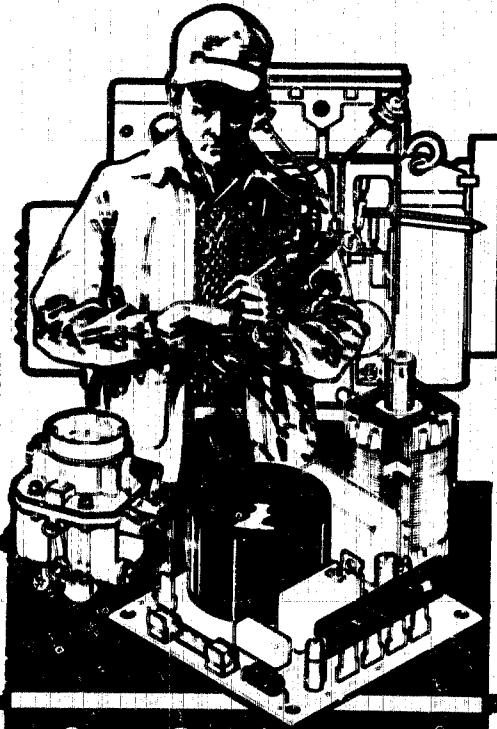
McGRAW-EDISON

Onan

**Parts
Manual**

MDEH

Marine GenSet



Onan Service Parts

**976-0222
3-84 (Spec K)
Replaces
3-83 (Spec K)
Printed in U.S.A.**

GENERAL INFORMATION

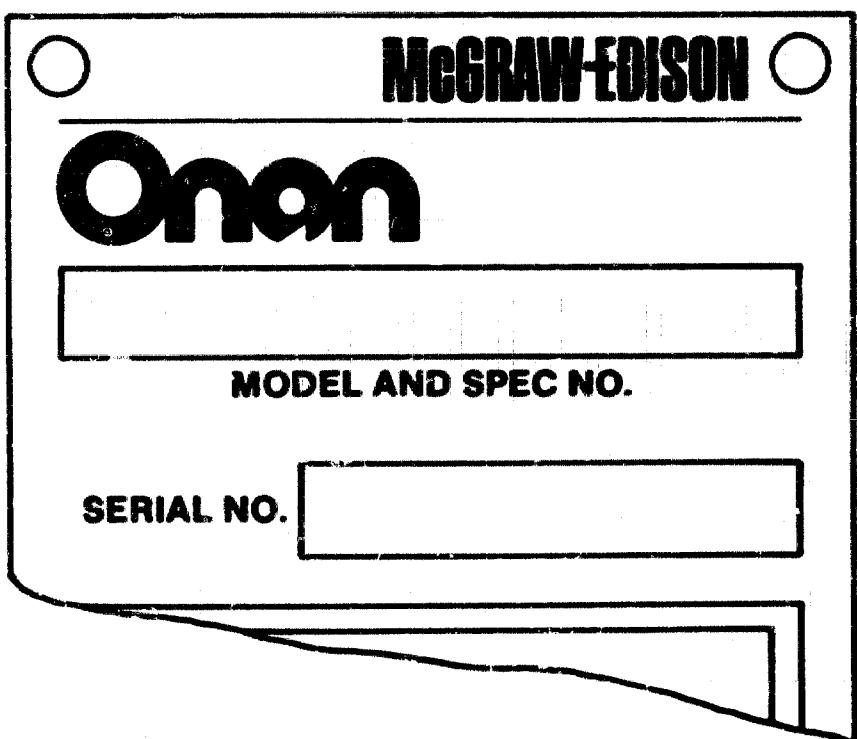
INSTRUCTIONS FOR ORDERING REPAIR PARTS

For parts or service, contact the dealer from whom you purchased this equipment or refer to your Nearest Authorized Onan Parts and Service Center.

To avoid errors or delay in filling your parts order, please furnish all information requested.

Always refer to the nameplate on your unit.

1. Always give the MODEL, SPEC NO. and SERIAL NO.



For handy reference, insert "YOUR" nameplate information in the spaces above.

2. Do not order by reference number; always use part number and description.
3. Give the part number, description and quantity needed of each item. If an older part cannot be identified, return the part prepaid to your dealer or nearest Onan Parts and Service Center. Print your name and address plainly on the package. Write a letter to the same address stating the reason for returning the part.
4. State definite shipping instructions. Any claim for loss or damage to your unit in transit should be filed promptly against the transportation company making the delivery. Shipments are complete unless the packing list indicates items are back ordered.

Prices are purposely omitted from this Parts Manual due to the confusion resulting from fluctuating costs, import duties, sales taxes, exchange rates, etc.

For current parts prices, consult your Onan Dealer, Distributor or Parts and Service Center.

"En esta lista de partes los precios se omiten de propósito, ya que bastante confusión resultó de fluctuaciones de los precios, derechos aduanales, impuestos de venta, cambios extrajeros, etc."

Consiga los precios vigentes de su distribuidor de productos "ONAN."

Table of Contents

General Information	A2
Alphabetical Index	A3
Introduction	A4
Set Data Table	A4
Electrical Data Table	A4
Engine Section - Table of Contents	B1
Control Section - Table of Contents	D1
Generator Section - Table of Contents	F1
Chassis - Housing Section - Table of Contents	G1

ALPHABETICAL INDEX

ITEM	PAGE	ITEM	PAGE
Air Cleaner.....	82	Heater, Elec - Control.....	E3
Alternator.....	83	Heater, Elec - Engine Coolant.....	C4
Ammeter, AC.....	010	Heater, Elec - Generator.....	F6
Ammeter, DC.....	02	Heat Exchanger.....	B10
Battery Cables.....	86	Hose(s) - Cooling System.....	B10
Belt, Drive - Alternator.....	83	Housing, Control.....	E7
Belt Guard(s).....	83,810	Indicator Light(s).....	B10
Cap, Radiator.....	810	Manifold, Exhaust - Liquid Cooled.....	C3
Capacitor Assy (U/W Switching Reg).....	014	Meter(s), AC.....	010
Chassis.....	G2	Mount, Vibration - Control.....	010
Circuit Breaker - Gen Control.....	010	Mount, Eng/Gen.....	G3
Circuit Breaker - Main Line.....	G4	Muffler, Exhaust - Marine.....	C1
Control, Engine - 12VDC,1 Fault Light...	02	Oil Drain Hardware.....	84
Control, Engine - 12VDC,5 Fault Light...	04	Pulley - Alternator.....	B3
Control, Engine - 24VDC,1 Fault Light...	06	Rotor, Exciter.....	F5
Control, Engine - 24VDC,5 Fault Light...	08	Rotor, Generator.....	F2
Control, Eng/Gen - Ruggedized.....	E1	Sender - Engine Temperature.....	84
Control, Generator.....	010	Sender - Oil Pressure.....	B6
Control, Generator with Switching Reg.	012	Solenoid, Elec - Fuel System.....	88
Cooling System with Heat Exchanger.....	810	Starter.....	86
Cooling System with Keel Cooler.....	812	Stator, Exciter.....	F2
Cover, Protective.....	E1	Stator, Generator.....	F2
Current Transformer(s).....	E2	Switch - Hi Exhaust Temperature.....	B14
Element, Air Cleaner.....	82	Switch - Hi Engine Temperature.....	B6
Exhaust Tee - Water Injection.....	86	Switch - Low Engine Temperature.....	84
Exhaust System - Marine.....	C1	Switch - Oil Pressure.....	B6
Fault Light(s).....	02	Switch - Overspeed.....	F2
Filter, Air.....	82	Tachometer.....	D2
Filter, Engine Coolant.....	C2	Valve - Vacuum Relief.....	C1
Filter, Fuel.....	88	Vernier Throttle.....	C6
Filter, Voltage Regulator.....	E6	Voltage Suppressor(s).....	F4
Fuel Line(s).....	86	Wattmeter.....	E5
Fuse(s).....	02,010	Water Pump.....	B10
Gauge(s), DC.....	02	Wiring Harness - Control to Engine.....	B4
Generator Assembly.....	F2	Wiring Harness - Engine Control.....	D2
Generator Adaptor.....	86	Wiring Harness - Generator Control....	010

INTRODUCTION

FORWORD

This parts manual applies to the standard generator sets listed below. Any engine parts modified or added to the set will be listed in this manual. These modified or added parts supersede similar parts listed in the Onan Engine manual. The illustrations are arranged in groups of related items, and each part or assembly is identified by a reference number. All parts illustrated are typical, and unless otherwise mentioned, parts are interchangeable. These typical illustrations are subject to change and reflect only the latest replacement parts arrangement. The Right and Left generator set sides are determined by facing the front end of the engine.

SET DATA TABLE

MODEL IDENTIFICATION	RATING	MODEL IDENTIFICATION	RATING
25.0 MDEH - * #£	25.000 Watts	30.0 MDEH - * #£	30.000 Watts

ELECTRICAL DATA TABLE

*VOLTAGE CODES	VOLTS	HERTZ	WIRE	PHASE	NOTES
3	120 240	60	3	1	
6C	240 480	60	4	3	
7	220 380	60	4	3	
9X	347 600	60	4	3	
15	120 240	60	12	1	
15	120 208	60	12	3	
	120 240				
	127 220				
	139 240				
	240 416				
	254 440				
	227 480				
53	120 240	50	3	1	
515	110 220	50	12	1	
	115 230				
515	110 190	50	12	3	
	110 220				
	115 200				
	115 230				
	120 208				
	127 220				
	220 380				
	230 400				
	240 416				
	254 440				

- * - Voltage codes follow model letters designations.
- # - Specification number; number 1 is standard, all others indicate variations.
- £ - Specification letter; letter advances (A to B, B to C, etc.) with major manufacturing changes.
- These generators are reconnectible, refer to Operator's manual for wiring data.

Engine Section

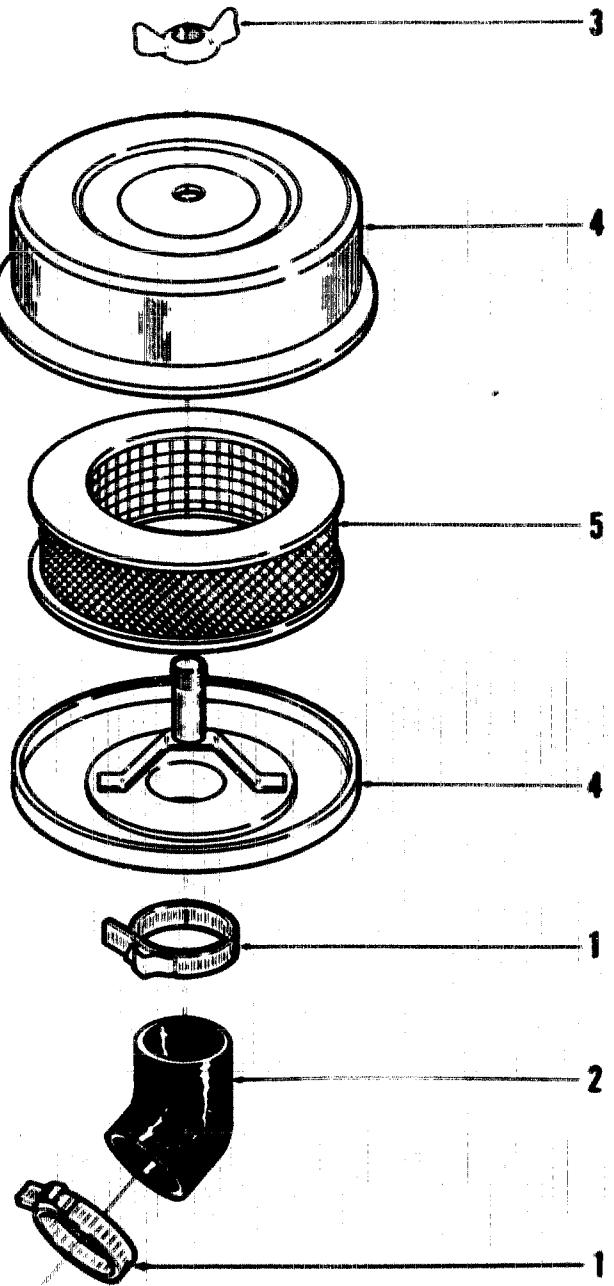
Table of Contents

ILLUSTRATION	PAGE
Air Cleaner.....	B2
Alternator.....	B3
Engine Parts - Left Side.....	B4
Engine Parts - Right Side.....	B6
Fuel System.....	B8
Cooling System with Heat Exchanger.....	B10
Cooling System with Keel Ccooler.....	B12
High Exhaust Temperature Switch.....	B14
Marine Exhaust System.....	C1
Engine Coolant Filter Assembly.....	C2
Exhaust Manifold - Liquid Cooled.....	C3
Engine Coolant Heater.....	C4
Vernier Throttle.....	C6

ENGINE REPLACEMENT PARTS

All engine replacement parts must be ordered from the engine manufacturer, except those modified or added by Onan. When ordering engine parts, refer to the manufacturer's nameplate and supply the Model, Spec. Serial numbers and other available information. Refer to the engine manufacturer's manuals for your nearest authorized distributor or parts center; or contact the Onan distributor from whom you purchased this set or assistance in ordering replacement parts.

AIR CLEANER

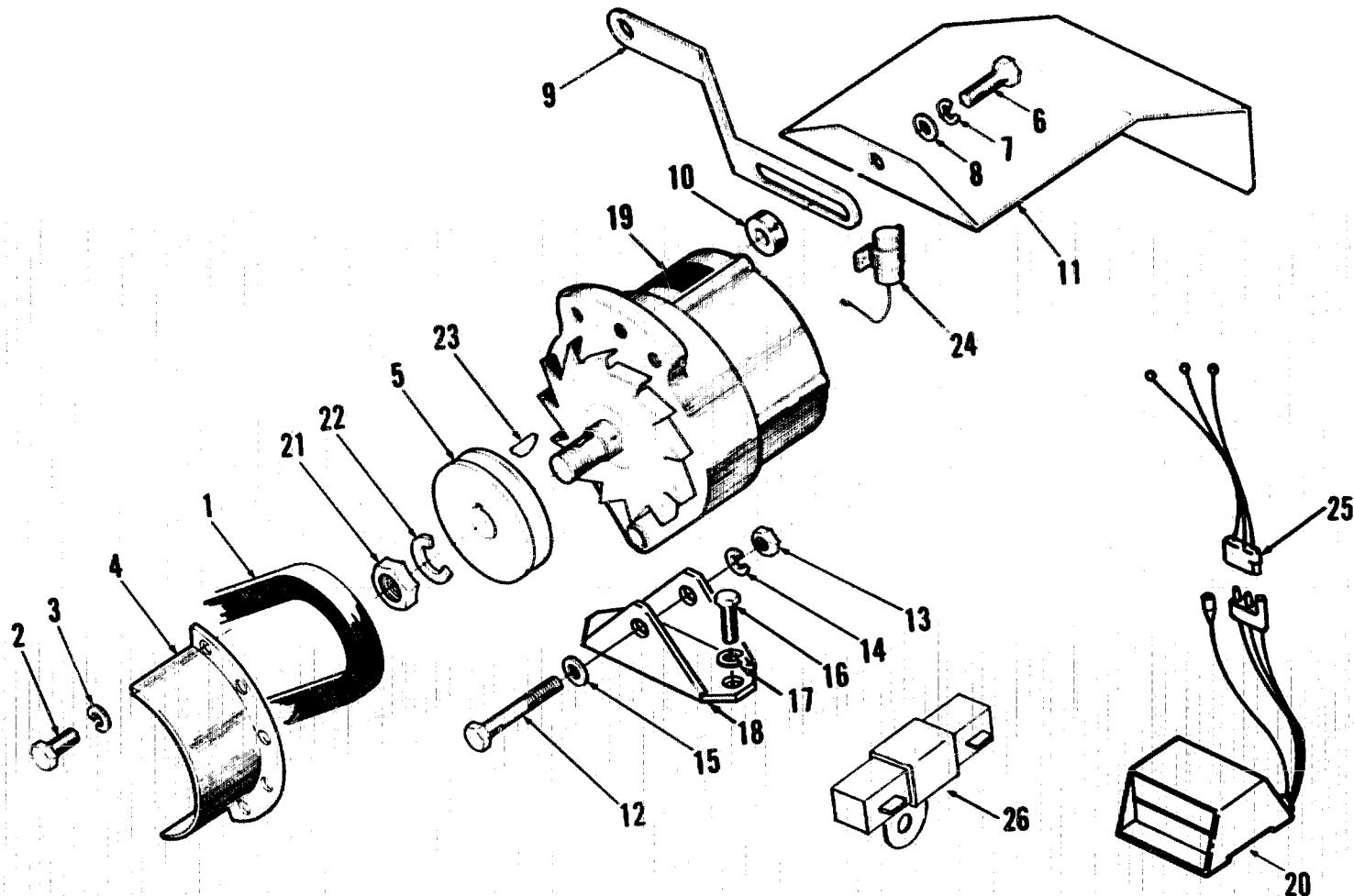


FS-1515

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	503-0354	2	Clamp, Hose
2	503-1187	1	Hose, Rubber - Preformed
3	865-0020	1	Nut, Wing (1/4-20)
4	140-1091	1	Air Cleaner Assembly (Includes Element)
5	140-1089	1	Element, Air Cleaner

B2

ALTERNATOR

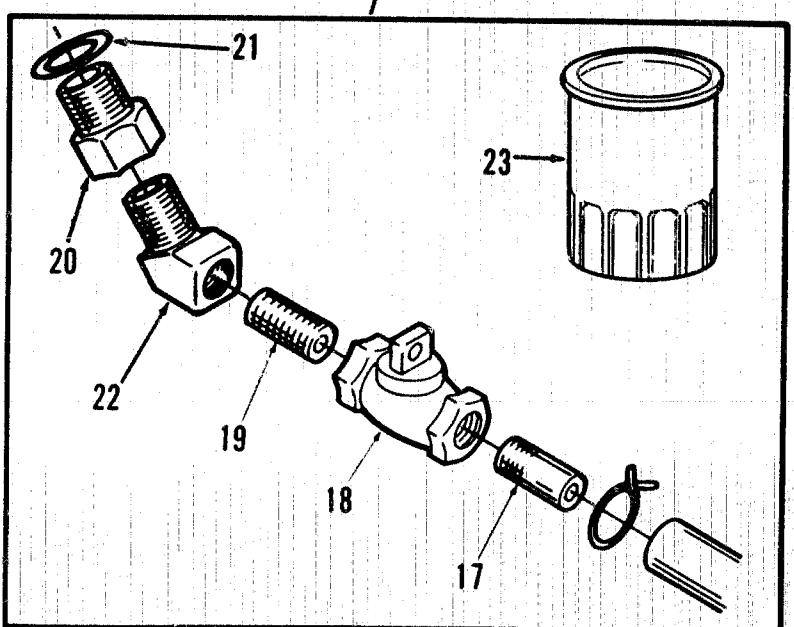
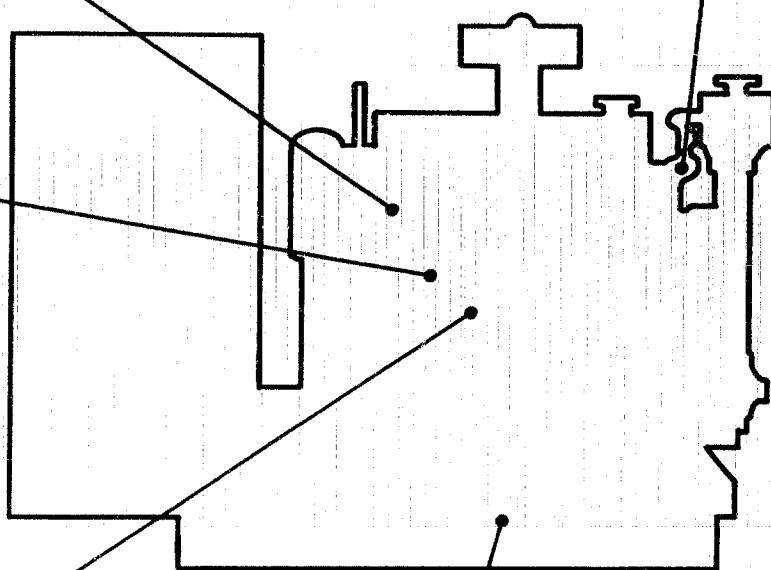
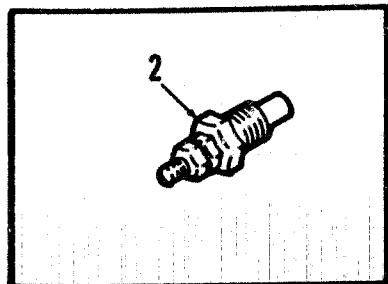
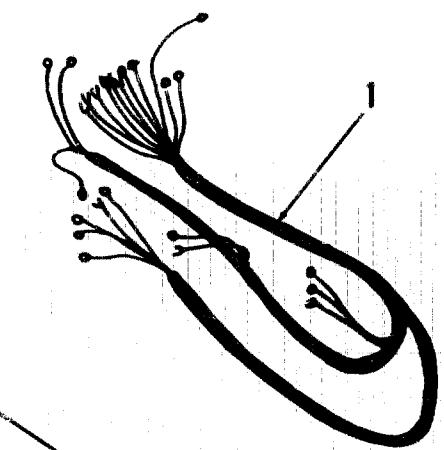
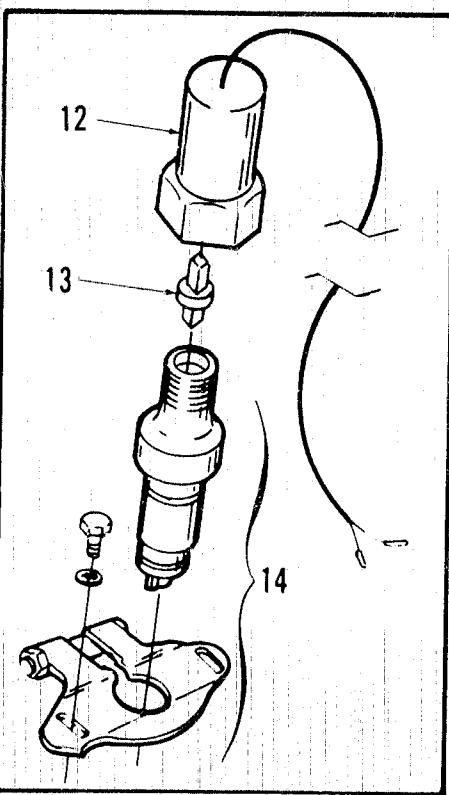
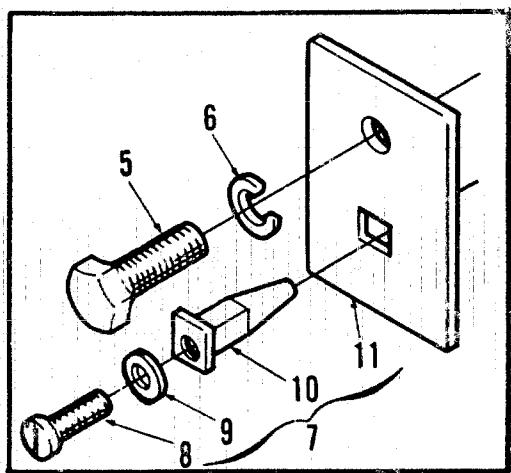
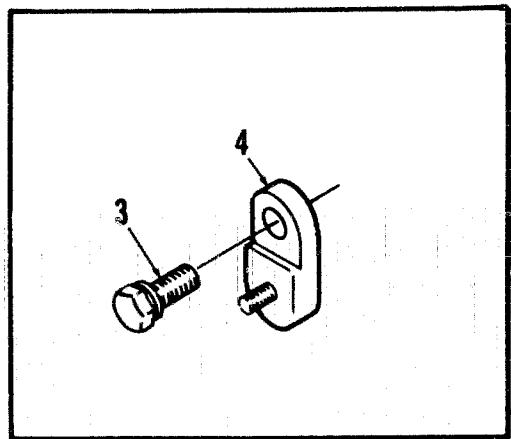


ES-1406

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	511-0084	1	Belt, Drive	16	850-0051	2	Screw, Cap - Hex Head (3/8-18 x 1-1/4")
2	800-0024	1	Screw, Cap - Hex Head (5/16-18 x 1/2")	17	850-0050	2	Washer, Lock - Spring (3/8")
3	850-0045	1	Washer, Lock - Spring (5/16")	18	191-1554	1	Bracket, Mounting
4	191-0725	1	Guard, Belt	19	ALTERNATOR (Includes Parts Marked £)		
5	191-0781	1	Pulley	191-1257	1	12 VDC	
6	800-0030	1	Screw, Cap - Hex Head (5/16-18 x 1-1/4")	191-1258	1	24/32 VDC	
7	850-0045	1	Washer, Lock - Spring (5/16")	20	REGULATOR, VOLTAGE		
8	526-0030	1	Washer, Flat (13/32"ID x 7/8"OD x 1/8"Thk)	191-1389	1	12 VDC	
9	191-0101	1	Strap, Adjusting	191-0548	1	24 VDC	
10	191-0791	1	Spacer (Optional)	191-1259	1	32 VDC	
11	191-0619	1	Heat Shield (Optional)	21	868-0007	1	£Nut, Hex (5/8-18)
12	800-1096	1	Screw, Cap - Hex Head (1/2-13 x 2-1/2")	22	850-0070	1	£Washer, Lock-Spring (5/8")
13	862-0016	1	Nut, Hex (1/2-13)	23	515-0093	1	£Key, Woodruff (#5)
14	850-0060	1	Washer, Lock - Spring (1/2")	24	312-0201	1	Capacitor (Not used all applications)
15	526-0219	3	Washer, Flat (17/32"ID x 1"OD x 1/8"Thk)	25	191-0681	1	Cable, Electrical (Alternator to Regulator)
				26	191-0550	1	Resistor (Used with 191-1258 Alternator)

£ - Parts included with Alternators

MISCELLANEOUS ENGINE PARTS - LEFT SIDE

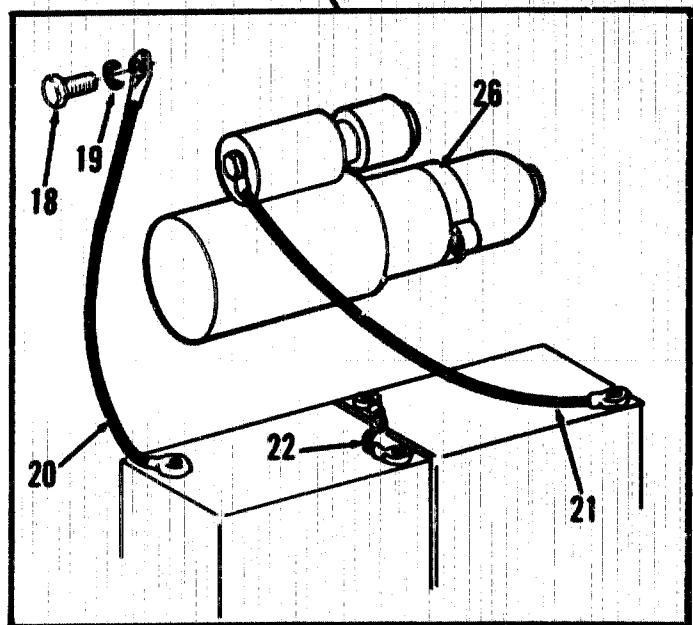
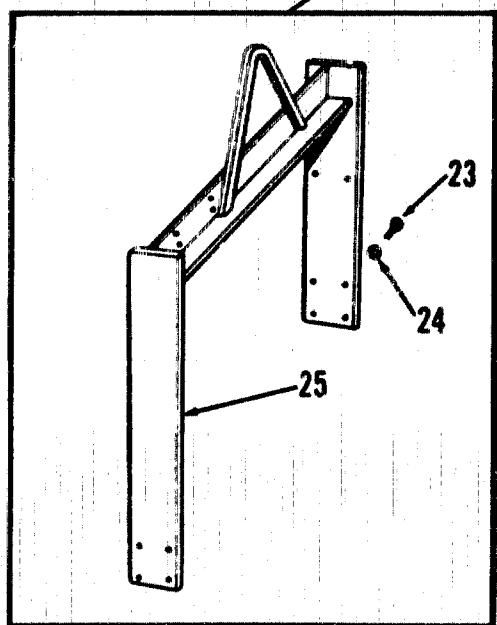
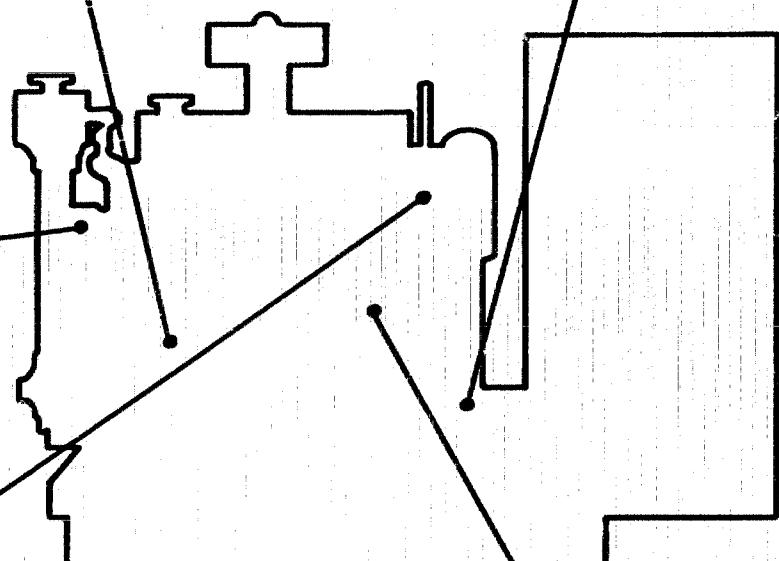
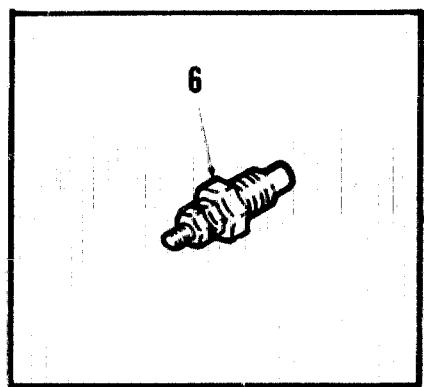
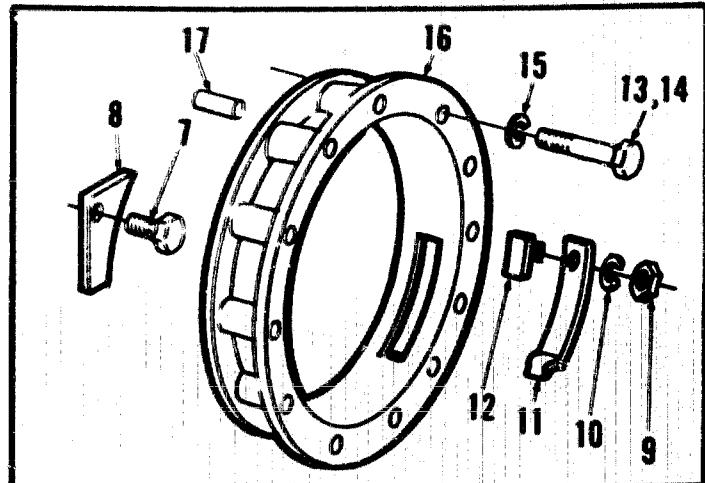
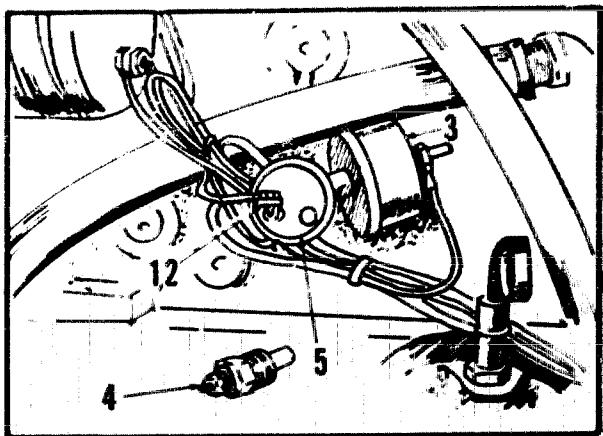


MISCELLANEOUS ENGINE PARTS - LEFT SIDE

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	WIRING HARNESS - ENGINE 338-1693	1	Standard	9	508-0015	1	+Washer, Insulating - Fiber (#8)
		1	Special (NOTE: Use Standard Wiring Harness and add electrical leads as required for optional sensors, switches per Gen Set wiring diagram)	10	870-0196	1	+Nut, Insulating (#8)
2	193-0246	1	*Sender, Temperature - Engine Coolant	11	332-1281	1	+Plate, Mounting - Terminal
3	821-0029	1	Screw, Self-locking - Hex Washer Head (3/8-16 x 3/4")	12	302-0750	1	*Sender, Tachometer Tang, Drive - Tachometer Sender
4	309-0269	1	*Switch, Thermostatic - Low Engine Temperature	13	302-0751	1	Drive Assembly - Tachometer
5	800-0047	1	Screw, Cap - Hex Head (3/8-16 x 5/8")	14	302-0757	1	Clamp, Hose
6	856-0010	1	Washer, Lock - External/Internal Tooth (3/8")	15	503-0131	1	Hose, Rubber (5/8"ID x 7/8"OD x 14"Lg)
7	332-1292	1	Terminal Board (Includes Parts Marked ~)	16	503-0891	1	Nipple, Pipe - Half (3/8"NPT x 1-1/2"Lg)
8	809-0035	1	+Screw, Machine - Thread Cutting, Round Head (#8 x 3/4")	17	505-0135	1	Valve, Cock - Brass (3/8"NPT)
				18	504-0030	1	Nipple, Pipe - Close (3/8"NPT x 1")
				19	505-0101	1	Adapter, Oil Drain
				20	102-0619	1	Gasket, "O" Ring
				21	102-0532	1	Elbow, Pipe - Street - 45 Deg (3/8 NPT)
				22	505-0119	1	Filter, Oil
				23	122-0644	1	

* - Items used with fault lights or gauges on Engine Control Panel.
+ - Parts included in Terminal Board.

MISCELLANEOUS ENGINE PARTS - RIGHT SIDE

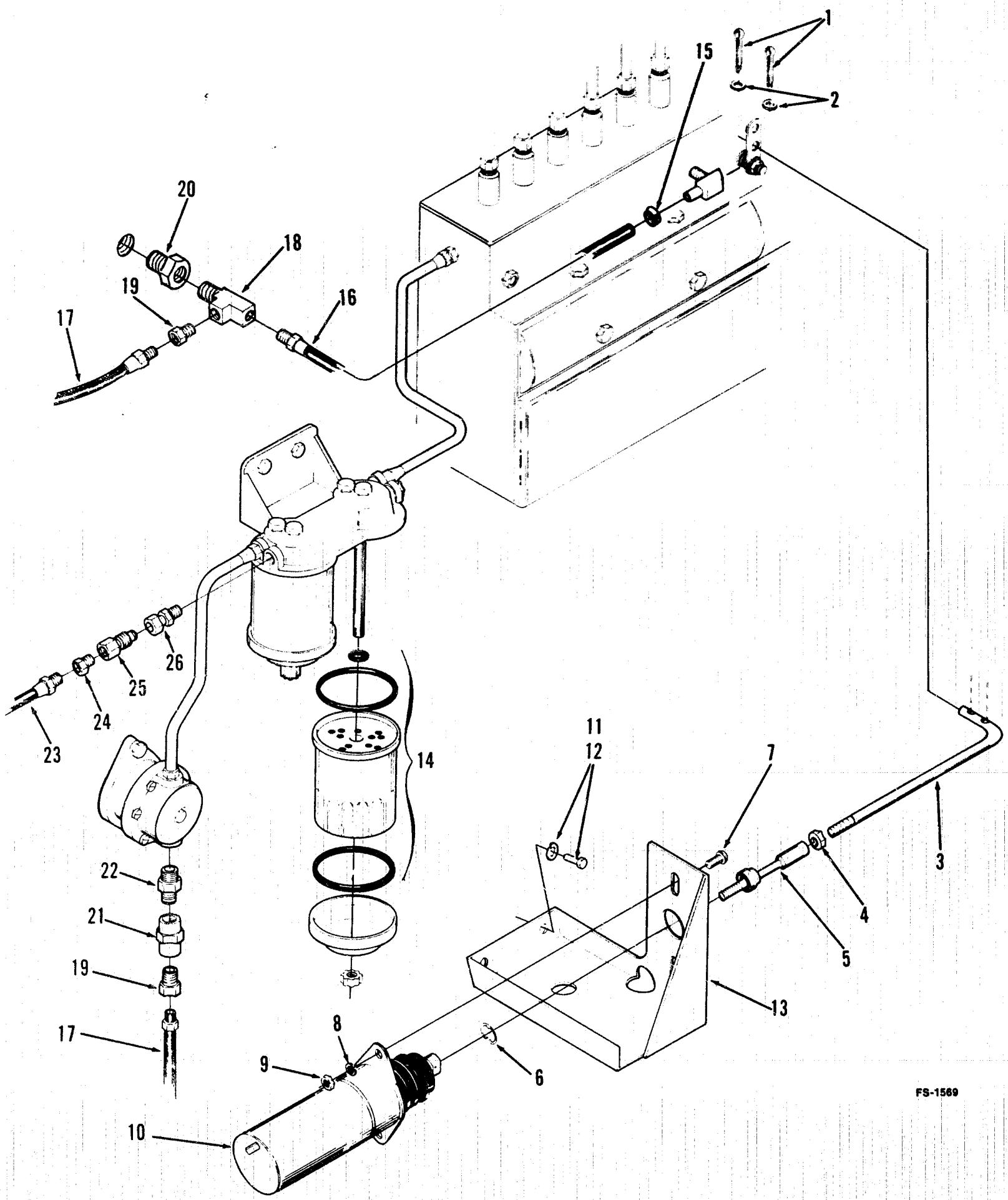


MISCELLANEOUS ENGINE PARTS - RIGHT SIDE

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	309-0064	1	*Switch, Pressure - Oil (Shutdown)	13	800-007L	8	Screw, Cap - Hex Head (7/16-14 x 1-1/4")
2	309-0169	1	*Switch, Pressure - Oil (Pre-Alarm)	14	800-0076	1	Screw, Cap - Hex Head (7/16-14 x 2-1/4")
3	193-0244	1	*Sender, Pressure - Oil	15	850-0055	9	Washer, Lock - Spring (7/16")
4	193-0249	1	Sender, Temperature - Oil	16	231-0149	1	Adapter, Generator
5	MOUNTING HARDWARE (Select as Applicable)			17	516-0152	2	Pin, Dowel - Adapter Alignment
	505-0059	1	Tee, Pipe (1/8"NPT)	18	800-0071	1	Screw, Cap - Hex Head (7/16-14 x 1")
	505-0763	1	Cross, Pipe (1/8"NPT)	19	856-0012	1	Washer, Lock - External/Internal Tooth (7/16")
	505-0098	1	Nipple, Pipe - Close (1/8"NPT x 3/4")	20	416-0530	1	Cable, Battery - Negative (16"Lg)
	505-0007	1	Bushing, Reducer - Hex (1/4"NPT x 1/8"NPT)	21	416-0531	1	Cable, Battery - Positive (24"Lg)
6	*SWITCH, HIGH ENGINE TEMPERATURE			22	416-0446	1	Cable, Battery - Jumper
	309-0178	1	Shutdown	23	800-0072	8	Screw, Cap - Hex Head (7/16-14 x 1-1/4")
	309-0179	1	Pre-Alarm	24	850-0055	8	Washer, Lock - Spring (7/16")
7	600-0069	1	Screw, Cap - Hex Head (7/16-14 x 3/4")	25	403-0836	1	Bracket, Lifting
8	191-0802	1	Cover, Access - Starter	26	STARTER		
9	862-0001	2	Nut, Hex (1/4-20)	191-0722		1	12 VDC
10	850-0040	2	Washer, Lock - Spring (1/4")	191-0703		1	24/32 VDC
11	232-2210	2	Cover, Access - Generator Adapter				
12	232-2211	2	Catch, Access Cover				

* - Items used with fault lights or gauges on Engine Control Panel.

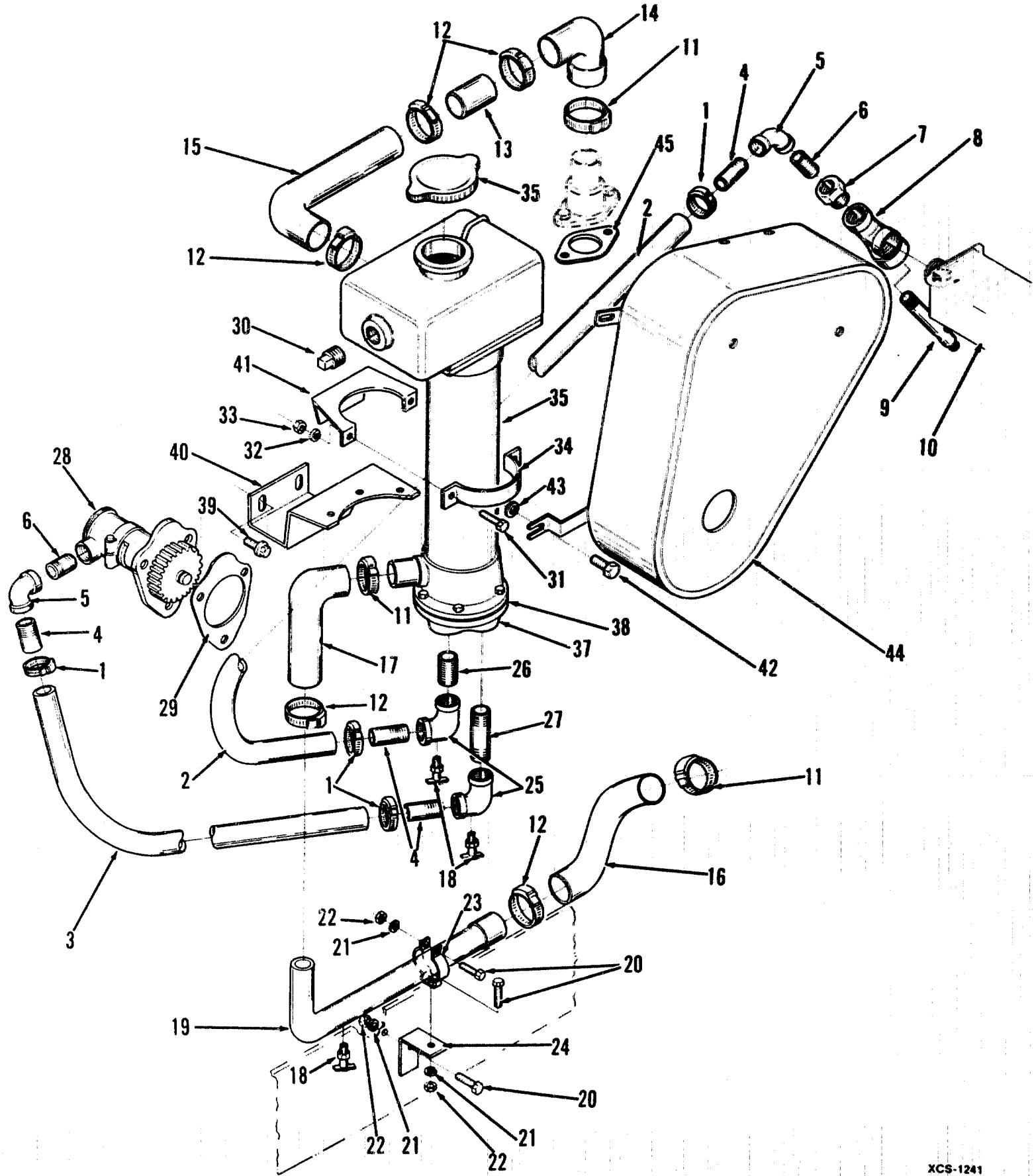
FUEL SYSTEM



FUEL SYSTEM

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	516-0027	2	Pin, Cotter (1/16" x 1/2" Lg)	17	501-0242	2	Line, Fuel - Flexible (24" Lg, 5/8-18 Female Swivel both ends)
2	526-0016	2	Washer, Flat (17/64" ID x 9/16" OD x 1/32" Thk)	18	502-0058	1	Tee, Pipe - Street (1/8-27 NPT)
3	ROD, ACTUATING - FUEL VALVE 150-1943	1	MDEH (4-3/4" Lg)	19	502-0577	2	Adapter, Pipe - Hex (5/8-18 x 1/8-27 NPT)
4	150-1944	1	MDEG (9" Lg)	20	502-0306	1	Adapter, Pipe - Hex (5/16-24 x 1/8-27 NPT)
4	862-0001	1	Nut, Hex (1/4-20)	21	502-0051	1	Coupling, Pipe (1/8-27 NPT)
5	150-1945	1	Ball Joint	22	502-0193	1	Connector, Pipe - Male (1/8-27 NPT x 1/2-20 SAE)
6	850-0040	1	Washer, Lock - Spring (1/4")	23	501-0227	1	Line, Fuel - Flexible (24" Lg, 1/8-27 Male x 1/8-27 Male Swivel)
7	812-0150	2	Screw, Machine - Round Head (1/4-20 x 5/8")	24	505-0007	1	Bushing, Reducer - Hex (1/4-18 NPT x 1/8-27 NPT)
8	850-0040	2	Washer, Lock - Spring (1/4")	25	502-0678	1	Adapter, Pipe - Hex (1/4-18 NPT Female x 9/16-18 UNF Male SAE 37 Deg)
9	862-0001	2	Nut, Hex (1/4-20)	26	502-0872	1	Adapter, Pipe - Hex (9/16-18 Female SAE 37 Deg x M14 x 1.5 MM)
10	307-1904	1	Solenoid - 12 VDC				
11	800-0071	2	Screw, Cap - Hex Head (7/16-14 x 1")				
12	850-0055	2	Washer, Lock - Spring (7/16")				
13	306-0214	1	Bracket, Mounting - Solenoid				
14	149-1697	2	Element - Fuel Filter (Includes Gaskets)				
15	503-0685	1	Clamp Hose				
16	LINE, FUEL - FLEXIBLE 501-0481	1	MDEH (20" Lg x 1/8-27 NPT Male)				
	501-0480	1	MDEG (30" Lg x 1/8-27 NPT Male)				

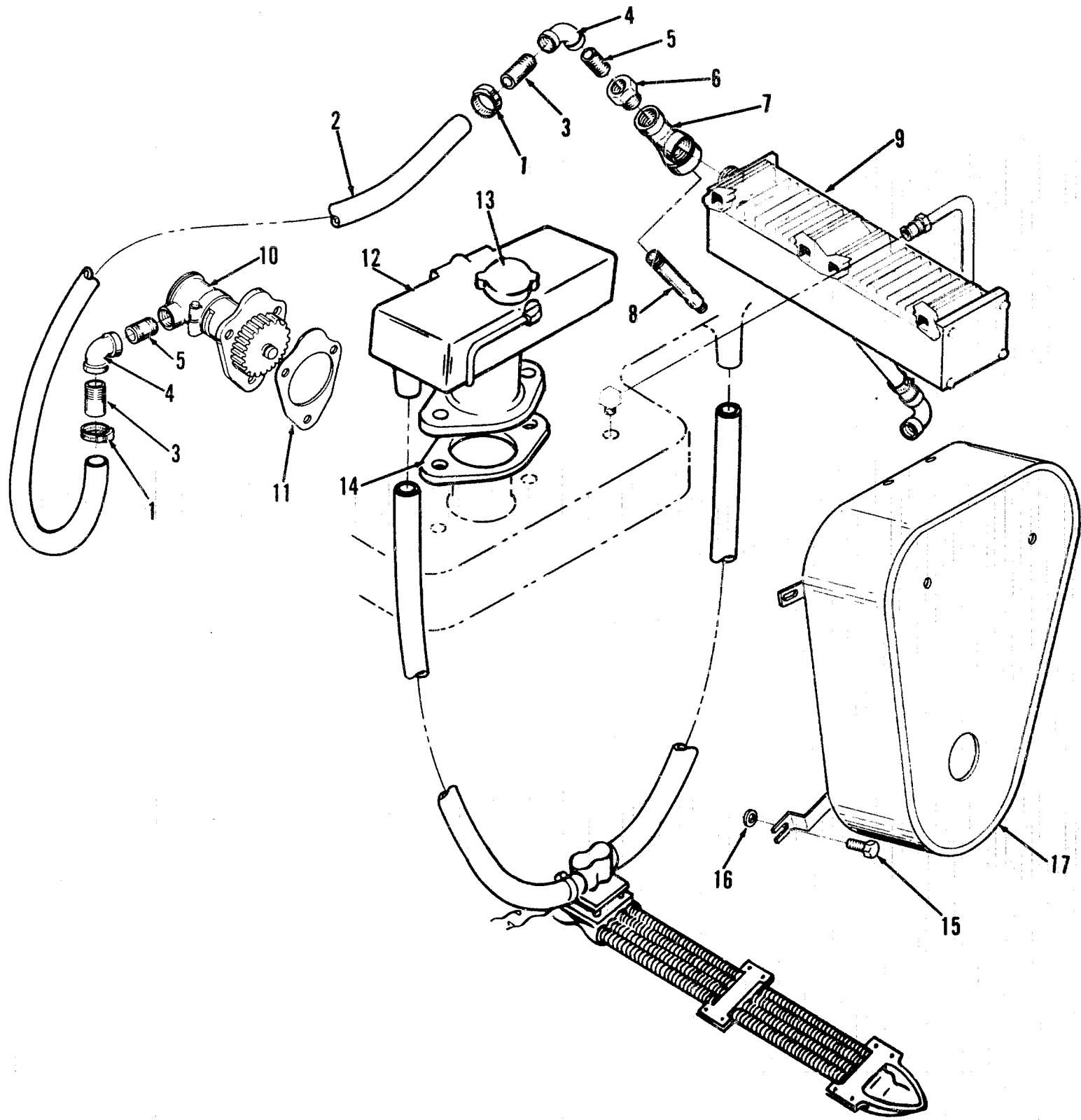
**COOLING SYSTEM
WITH HEAT EXCHANGER**



COOLING SYSTEM WITH HEAT EXCHANGER

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	503-0189	4	Clamp, Hose
2	503-1164	1	Hose, Rubber (1"ID x 1-3/8"OD x 48"Lg)
3	503-1163	1	Hose, Rubber (1"ID x 1-3/8"OD x 24"Lg)
4	505-0907	4	Nipple, Pipe - Half, Brass (3/4"NPT x 2)Lg)
5	505-0909	2	Elbow, Pipe - 90 Deg. Brass (3/4"NPT)
6	505-0912	2	Nipple, Pipe - Close, Brass (3/4"NPT)
7	505-0772	1	Bushing, Reducer - Hex (1-1/4"NPT x 3/4"NPT)
8	505-0771	1	Tee, Pipe - Reducing (2"NPT x 2"NPT x 1-1/4"NPT)
9	130-0725	1	Tube, Injection - Water
10		REF	Manifold, Exhaust - Liquid Cooled (See Separate Figure for Components)
11	503-0365	3	Clamp, Hose
12	503-0004	5	Clamp, Hose
13	130-0508	1	Adapter, Tube
14	503-1218	1	Hose, Rubber - Preformed
15	503-0553	1	Hose, Rubber - Preformed
16	503-1216	1	Hose, Rubber - Preformed
17	503-1220	1	Hose, Rubber - Preformed
18	504-0005	3	Cock, Drain (1/8"NPT)
19	130-2230	1	Tube, Preformed
20	800-0007	3	Screw, Cap - Hex Head (1/4-20 x 1")
21	850-0040	3	Washer, Lock - Spring (1/4")
22	862-0001	3	Nut, Hex (1/4-20)
23	331-0101	1	Hanger, Pipe
24	130-2231	1	Bracket, Angle
25	505-0938	2	Elbow, Pipe - 90 Deg. Reducing, with Tapped Drain Port (1"NPT x 3/4"NPT)
26	505-0908	1	Nipple, Pipe - Close, Brass (1"NPT x 1-1/2)Lg)
27	509-0910	1	Nipple, Pipe - Brass (1"NPT x 3)Lg)
28	132-0274	1	Pump, Water - Replacement (Does Not Include Mounting Adapter and Gear)
29	132-0273	1	Gasket
30	505-0130	1	Plug, Pipe - Square Head (3/4"NPT)
31	800-0007	2	Screw, Cap - Hex Head (1/4-20 x 1")
32	850-0040	2	Washer, Lock - Spring (1/4")
33	862-0001	2	Nut, Hex (1/4-20)
34	130-0722	1	Clamp
35	130-0505	1	Heat Exchanger (Includes End Bonnet, Gasket, Pressure Cap)
36	130-0900	1	Cap, Radiator (4 Lb)
37	130-0901	1	Bonnet, End
38	130-0902	1	Gasket
39	821-0016	4	Screw, Self-locking - Hex Washer Head (5/16-18 x 3/4")
40	130-0715	1	Bracket, Support - Lower
41	130-2227	1	Bracket, Support - Upper
42	800-0048	3	Screw, Cap - Hex Head (3/8-16 x 3/4")
43	526-0029	2	Washer, Flat (3/8")
44	130-2223	1	Guard, Belt
45	130-1016	1	Gasket - Water Outlet

COOLING SYSTEM WITH KEEL COOLER



B12

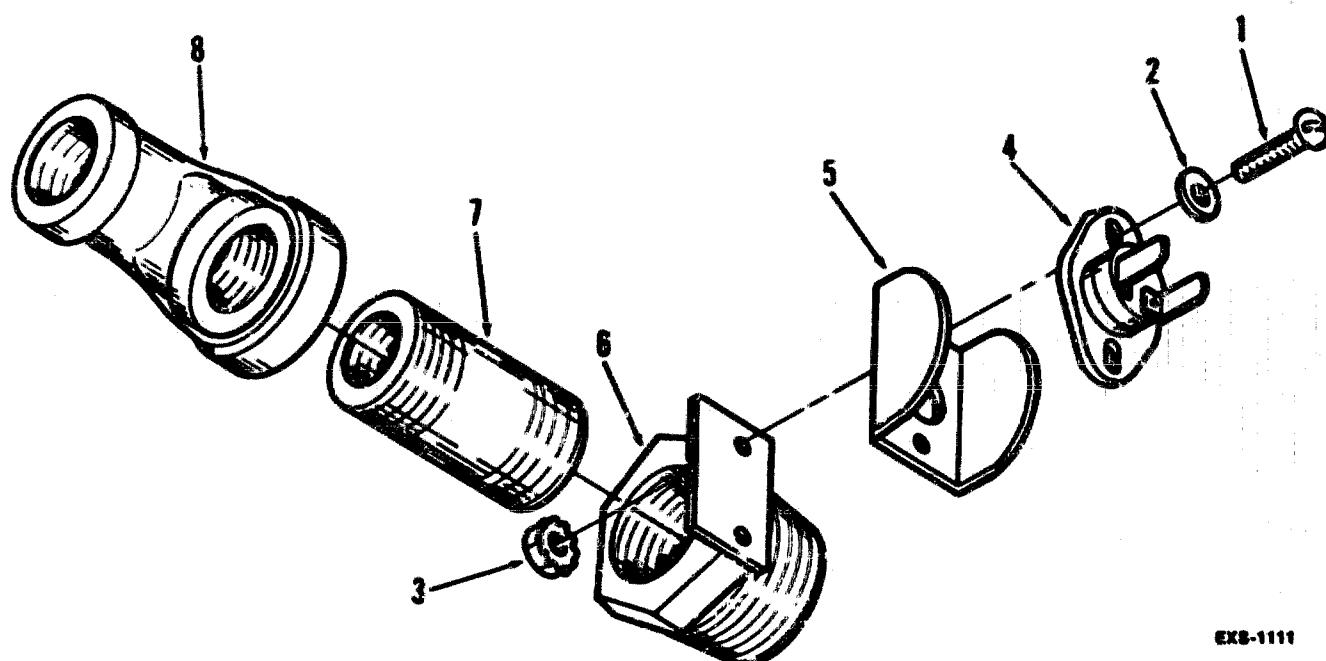
CS-1243

KEEL COOLING SYSTEM

REF.	PART NO.	QTY. USED	PART DESCRIPTION
1	503-0189	2	Clamp, Hose
2	503-1164	1	Hose, Rubber (1"ID x 1-3/8"OD x 48"Lg)
3	505-0907	2	Nipple, Pipe - Half, Brass (3/4"NPT x 2"Lg)
4	505-0909	2	Elbow, Pipe - 90 Deg. Brass (3/4"NPT)
5	505-0912	2	Nipple, Pipe - Close, Brass (3/4"NPT)
6	505-0772	1	Bushing, Reducer - Hex (1-1/4"NPT x 3/4"NPT)
7	505-0771	1	Tee, Pipe - Reducing (2"NPT x 2"NPT x 1-1/4"NPT)
8	130-0725	1	Tube, Injection - Water
9		REF	Manifold, Exhaust - Liquid Cooled (See Separate Figure for Components)
10	132-0274	1	Pump, Water - Replacement (Does Not Include Adapter and Gear)
11	132-0273	1	Gasket
12	130-0705	1	Tank, Expansion (Includes Cap)
13	130-0900	1	Cap, Radiator (4 Lb)
14	130-1016	1	Gasket
15	800-0048	3	Screw, Cap - Hex Head (3/8-16 x 3/4")
16	526-0029	2	Washer, Flat (3/8")
17	130-2223	1	Guard, Belt

NOTE: See your authorized Onan Marine Dealer for parts or service
on items installed between the Generator Set and the Keel Cooler.

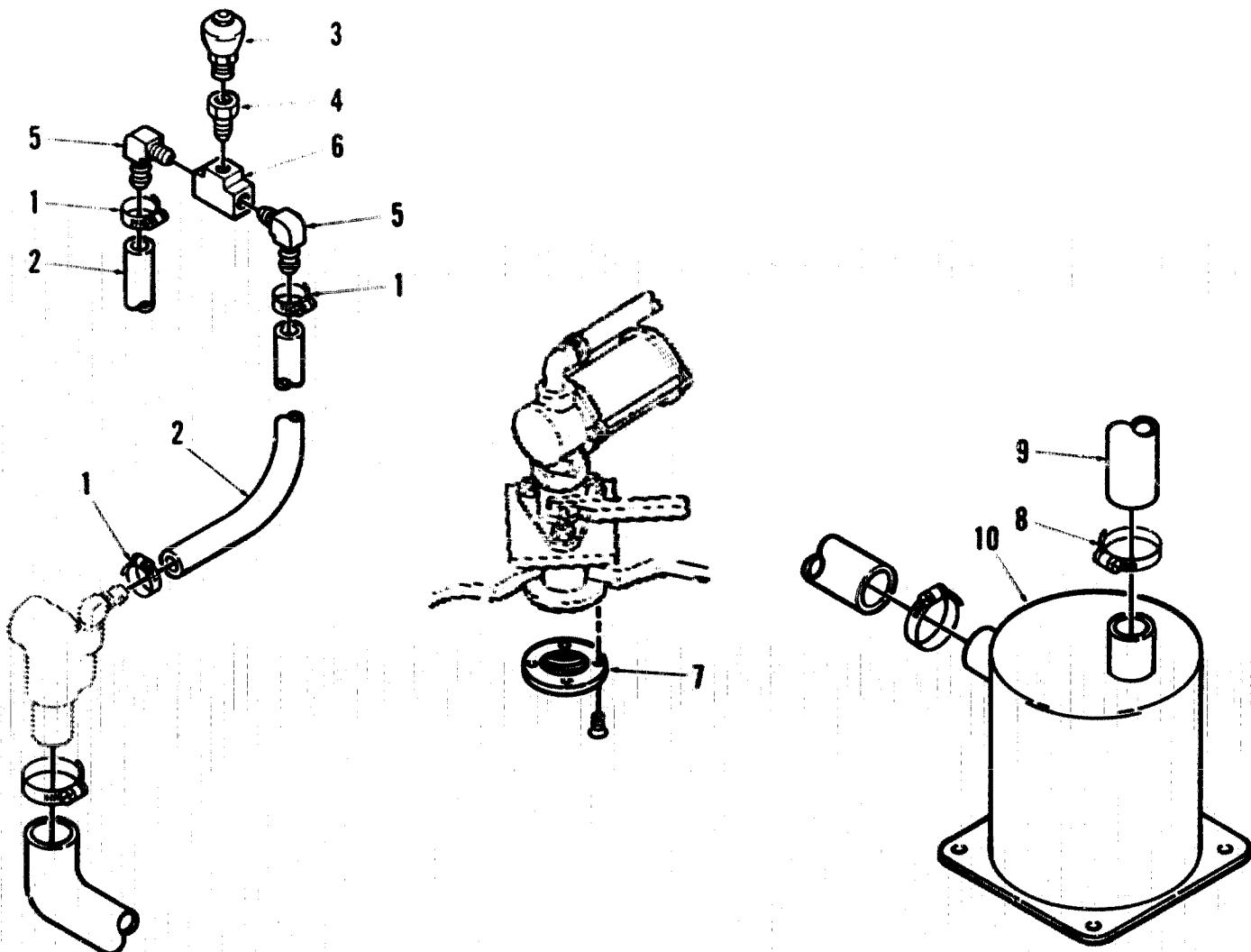
HIGH EXHAUST TEMPERATURE SWITCH



EXS-1111

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	812-0061	2	Screw, Machine - Round Head (#6-32 x 3-8")
2	526-0018	2	Washer, Flat (17/64" ID x 5/8" OD x 1/16" Thk)
3	870-1183	2	Nut, With ET Lockwasher (#6-32)
4	309-0484	1	Switch, High Temperature
5	309-0501	1	Shield, Switch
6	BUSHING WITH SWITCH MOUNTING PLATE		
	505-1336	1	MDEG (3" NPT x 2-1/2" NPT)
	505-1337	1	MDEH (2-1/2" NPT x 2" NPT)
7	NIPPLE, PIPE		
	505-0114	1	MDEG (2-1/2" NPT x 3")
	505-0645	1	MDEH (2" NPT x 3")
8	TEE, PIPE - REDUCING		
	505-1334	1	MDEG (2-1/2" NPT x 1-1/4" NPT x 2-1/2" NPT)
	505-0771	1	MDEH (2" NPT x 1-1/4" NPT x 2" NPT)

MARINE EXHAUST SYSTEM

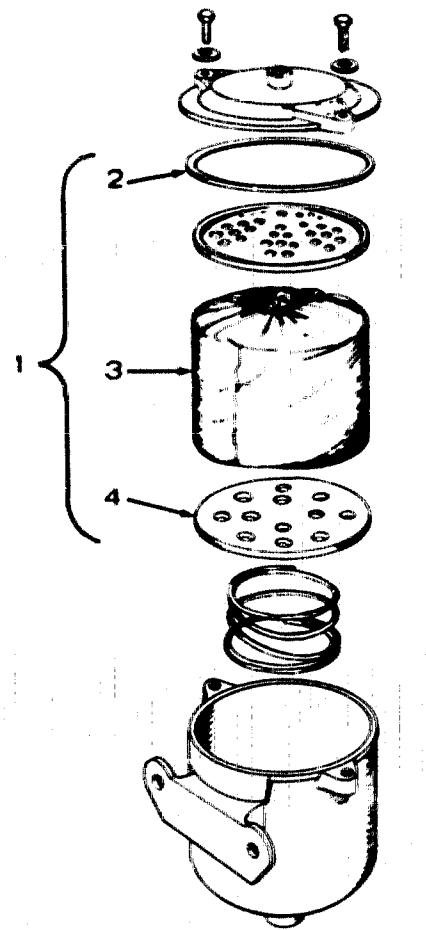


EXS-1109

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	CLAMP, HOSE (Select)		
	503-0685	4	3/8" to 1-1/2" Hose Size
	503-0446	4	7/16" to 3-1/4" Hose Size
	503-0547	4	1-1/2" to 7/8" Hose Size
	503-0183	4	9/16" to 1-1/16" Hose Size
	503-0398	4	13/16" to 1-3/4" Hose Size
2	HOSE, RUBBER (Select)		
	503-0890	2	1-1/2" ID x 27-3/32" OD x 24" LG
	503-0658	2	1-1/2" ID x 27-3/32" OD x 48" LG
	503-0803	2	1-1/2" ID x 27-3/32" OD x 144" LG
	503-1163	2	1" ID x 1-3/8" OD x 24" LG
	503-1202	2	1" ID x 1-3/8" OD x 72" LG
3	504-0062	1	Valve - Vacuum Relief (1-1/2" NPT)
4	502-0270	1	Adapter Hex - Brass (3/8" NPT x 1-1/2" NPT)
5	ELBOW, PIPE TO HOSE (Select)		
	502-0237	2	1/2" NPT x 3/8" ID Hose
	502-0881	2	3/4" NPT x 1" ID Hose
6	TEE, PIPE - BRASS (Select)		
	502-0090	1	3/8" NPT - three places
	502-0883	1	3/4" NPT x 3/4" NPT x 1-1/2" NPT
7	155-1002	1	Strainer Water - Thru Hull

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
8	CLAMP, HOSE (Select)		
	503-0429	8	1-1/16" to 2" Hose Size
	503-0365	8	1-9/16" to 2-1/2" Hose Size
	503-0514	8	1-13/16" to 3" Hose Size
	503-0354	8	2-11/16" to 3-1/4" Hose Size
	503-0648	8	2-9/16" to 3-1/2" Hose Size
	503-0612	8	3-5/16" to 4-1/4" Hose Size
	503-1180	8	4" to 4-3/4" Hose Size
9	HOSE, EXHAUST - MARINE (Select)		
	503-1293	1	1-5/8" ID x 2-1/32" OD x 120" LG
	503-1296	1	1-7/8" ID x 2-9/32" OD x 120" LG
	503-1320	1	2" ID x 2-13/32" OD x 120" LG
	503-1299	1	2-1/4" ID x 2-5/8" OD x 120" LG
	503-1302	1	2-1/2" ID x 2-15/16" OD x 120" LG
	503-1305	1	2-7/8" ID x 3-7/16" OD x 120" LG
	503-1308	1	3-1/2" ID x 4-3/32" OD x 120" LG
10	MUFFLER, EXHAUST - MARINE		
	155-2029	1	2" OD Inlet/Outlet Tubes
	155-2009	1	2-1/4" OD Inlet/Outlet Tubes
	155-2010	1	2-1/2" OD Inlet/Outlet Tubes
	155-2011	1	2-7/8" OD Inlet/Outlet Tubes
	155-2012	1	3-1/2" OD Inlet/Outlet Tubes

ENGINE COOLANT FILTER ASSEMBLY

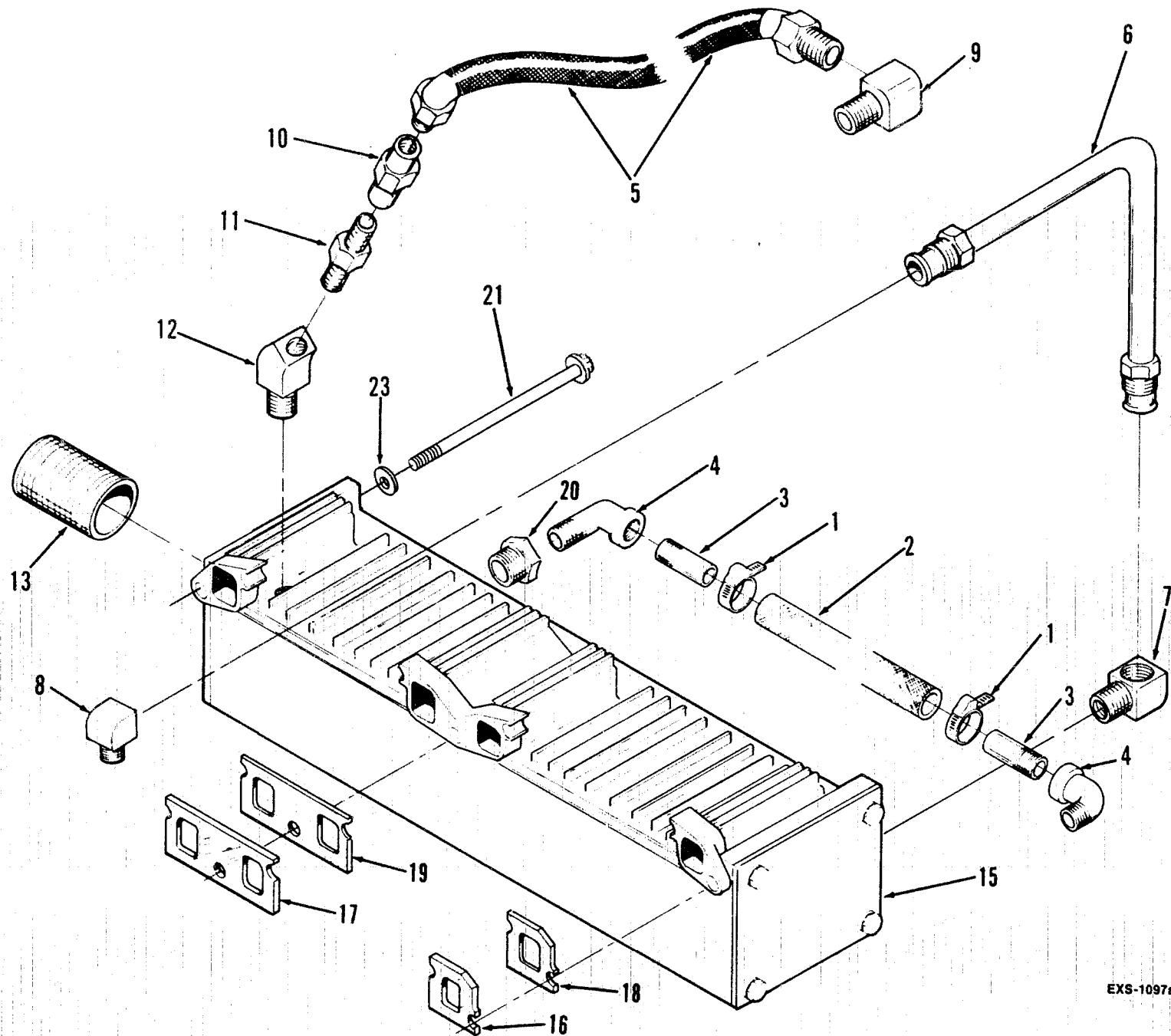


CS-1059

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
FILTER ASSEMBLY, ENGINE COOLANT			
	130-0462	1	15 to 30 Gallon Capacity (Replacement Items Marked £)
	130-0497	1	5 to 10 Gallon Capacity (Replacement Items Marked †)
1 KIT REPLACEMENT - FILTER (Includes Items 2 Thru 4)			
	130-0769	1	£Original Equipment (Water Coolant)
	130-0770	1	£Special (Perm. Anti-Freeze Coolant)
	130-0771	1	†Original Equipment (Water Coolant)
	130-0772	1	†Special (Perm. Anti-Freeze Coolant)
2 GASKET, COVER			
	130-0777	1	£
	130-0778	1	†
3 ELEMENT, FILTER			
	130-0773	1	£Chromate (Water Coolant)
	130-0774	1	£Special (Perm. Anti-Freeze Coolant)
4 PLATE, SACRIFICIAL			
	130-0779	1	£
	130-0780	1	†

£ - NOTE: Used on 130-0462 Filter Assembly
† - NOTE: Used on 130-0497 Filter Assembly

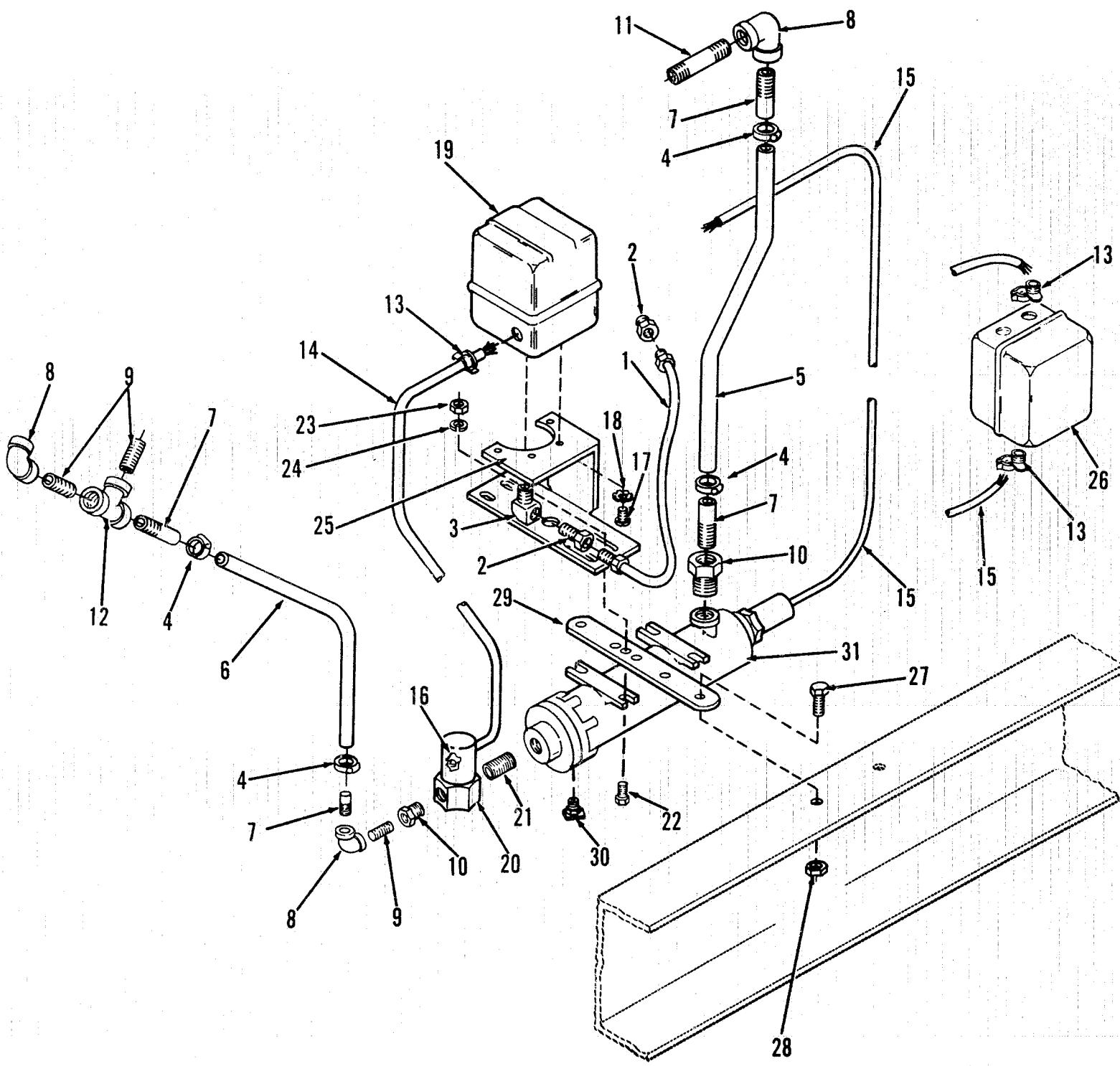
EXHAUST MANIFOLD (LIQUID COOLED)



EXS-1097a

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	503-0183	2	Clamp, Hose	12	502-0053	1	Elbow, Pipe - Street
2	503-0833	1	Hose, Rubber (5/8"ID x 61/64"OD x 24"Lg)	13	505-0173	1	45 Deg (1/8 NPT) Nipple, Pipe -
3	505-0135	2	Nipple, Pipe - Half (3/8"NPT x 1-1/2)Lg)	15	154-2415	1	(2"NPT x 4)Lg) Manifold, Exhaust - Liquid
4	505-0120	2	Elbow, Pipe - Street 90 Deg (3/8"NPT)	16	154-2421	2	Cooled Shim
5	501-0009	1	Line, Fuel - Flexible (1/8 NPT Male x 1/4 SAE Male x 36)Lg)	17	154-2422	1	Shim
6	130-2225	1	Line, Water	18	154-2423	2	Gasket
7	502-0073	1	Elbow, Pipe to Tube - 90 Deg	19	154-2424	1	Gasket
8	502-0074	1	Elbow, Pipe to Tube - 90 Deg	20	505-0019	1	Bushing, Reducer - Hex (1/2 NPT x 3/8 NPT)
9	502-0002	1	Elbow, Pipe Street, 90 Deg (1/8NPT)	21	800-0063	3	Screw, Cap - Hex Head (3/8-16 x 4-1/4")
10	502-0051	1	Coupling, Pipe - Hex (1/8NPT x 9/16")	23	526-0066	3	Washer, Flat (3/8")
11	502-0082	1	Nipple, Pipe - Hex (1/8 NPT)				

ENGINE COOLANT HEATER (HORIZONTAL TANK)



C4

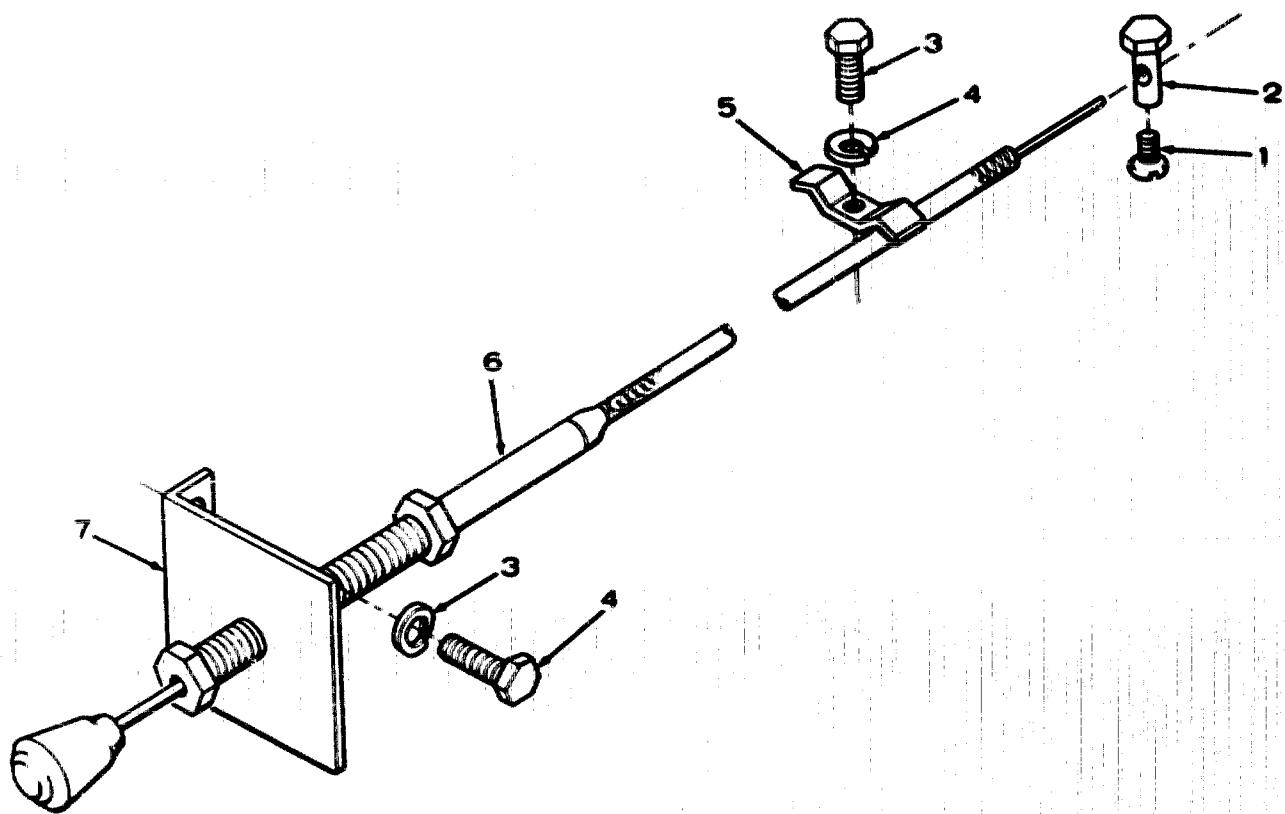
XCS-1240

ENGINE COOLANT HEATER ASSEMBLY (HORIZONTAL TANK)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
ENGINE COOLANT HEATER ASSEMBLY							
		1	115 Volt, 1 Phase	16	TERMINALS (Select as Required)	2	#10 (Used on White Leads)
		1	208 Volt, 1 Phase	332-0014		4	#8 (Used on White Leads)
		1	208 Volt, 3 Phase	332-0149		4	Wire, Nut Type (Used on Black Leads)
		1	240 Volt, 1 Phase	323-0957		4	Screw, Machine - Round Head (#8-32 x 1/2")
		1	380 Volt, 1 Phase	17	812-0079	4	Washer, Lock - ET (#8)
		1	380 Volt, 3 Phase	18	854-0007	1	Switch, Pressure
		1	480 Volt, 1 Phase	19	309-0307	1	Switch, Thermostatic
		1	480 Volt, 3 Phase	20	309-0304	1	Nipple, Pipe - Close (1"NPT x 1-1/4"Lg)
1	501-0227	1	Line, Fuel - Flexible	21	505-0004	1	Screw, Cap - Hex Head (1/4-20 x 1")
2	505-0007	2	Bushing, Reducer - Hex (1/4"NPT x 1/8"NPT)	22	800-0007	4	Nut, Hex (1/4-20)
3	502-0054	1	Elbow, Pipe - Street, 90 Deg., Brass (1/4 NPT)	23	862-0001	4	Washer, Lock - Spring (1/4")
4	503-0183	4	Clamp, Hose	24	850-0040	1	Bracket, Support - Pressure Switch
5	503-0146	1	Hose, Rubber (5/8"ID x 61/64"OD x 32)Lg)	25	333-0224		
6	503-0261	1	Hose, Rubber (5/8"ID x 61/64"OD x 9)Lg)	26	CONTACTOR, ELECTRICAL (Select as Applicable)		
7	505-0135	4	Nipple, Pipe - Half (3/8"NPT x 1-1/2)Lg)	307-1460		1	230 VAC, 3 Pole
8	505-0039	3	Elbow, Pipe - 90 Deg (3/8"NPT)	307-1164		1	460 VAC, 3 Pole
9	505-0101	3	Nipple, Pipe - Close (3/8"NPT x 1)Lg)	27	821-0018	4	Screw, Self-Locking - Hex Washer Head (5/16-18 x 3/4")
10	505-0455	2	Bushing, Reducer - Hex (1"NPT x 3/8"NPT)	28	870-0257	4	Nut, Self-Locking, Hex Washer Head (5/16-18)
11	505-0076	1	Nipple, Pipe (3/8"NPT x 3)Lg)	29	130-1191	2	Bracket, Mounting - Heater
12	505-0060	1	Tee, Pipe (3/8"NPT)	30	504-0003	1	Cock, Drain (1/4"NPT)
13	331-0027	6	Clamp Cable	31	HEATER, ELECTRICAL - ENGINE COOLANT (Select as Applicable)		
14	#		Cord, Electrical (2-#14, Type 60, 600 Volt)	333-0158		1	2000 Watts, 115 Volt, 1 Phase
15	CABLE, ELECTRICAL (TYPE SO, 600 Volt)	#	3 - #12 (Used on Single Phase Hookup)	333-0167		1	2000 Watts, 208 Volt, 1 Phase
	#		4 - #14 (Used on Three Phase Hookup)	333-0148		1	2000 Watts, 208 Volt, 3 Phase
				333-0141		1	2000 Watts, 240 Volt, 3 Phase
				333-0176		1	2000 Watts, 380 Volt, 1 Phase
				333-0170		1	2000 Watts, 380 Volt, 3 Phase
				333-0147		1	2000 Watts, 480 Volt, 1 Phase
				333-0146		1	2000 Watts, 480 Volt, 3 Phase

- Electrical Cable and Cord shown for Reference Purpose only.

VERNIER THROTTLE



M-1170

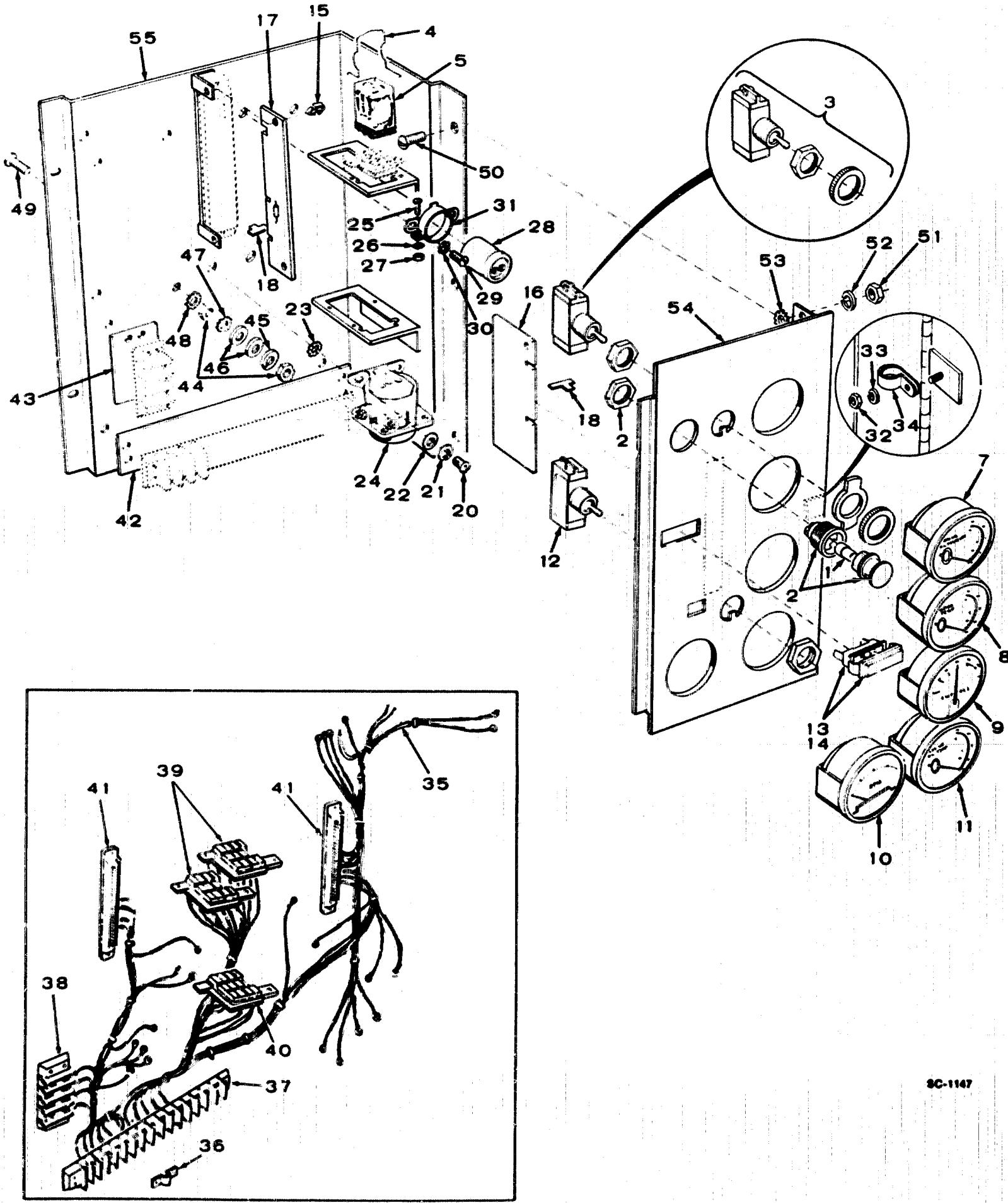
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	812-0075	1	Screw, Machine - Round Head $(\#8-32 \times 1\frac{1}{4}^{\prime\prime})$
2	152-0158	1	Swivel
3	800-0005	3	Screw, Cap - Hex Head $(1\frac{1}{4}-20 \times 3\frac{1}{4}^{\prime\prime})$
4	850-0040	3	Washer, Lock - Spring $(1\frac{1}{4}^{\prime\prime})$
5	152-0036	1	Clamp, Hold-down - Cable
6	152-0120	1	Throttle Control - Vernier
7	151-0230	1	Bracket Mounting - Throttle Control

Control Section

Table of Contents

ILLUSTRATION	PAGE
Engine Control with One Fault Light - 12 VDC.....	D2
Engine Control with Five Fault Lights - 12 VDC.....	D4
Engine Control with One Fault Light - 24 VDC.....	D6
Engine Control with Five Fault Lights - 24 VDC.....	D8
Generator Control.....	D10
Generator Control with Switching Regulator.....	D12
Capacitor Assembly used with Switching Regulator.....	D14
Engine/Generator Ruggedized Control with Shield.....	E1
Current Transformer Assembly.....	E2
Control Heater.....	E3
Control Housing.....	E4
Wattmeter.....	E5
Voltage Regulator Filter.....	E6

ENGINE CONTROL WITH ONE FAULT LIGHT (12 VDC)



D2

ENGINE CONTROL WITH ONE FAULT LIGHT (12 VDC)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	322-0004	1	Lamp Incandescent (12 VDC)	26	860-0006	1	Nut, Hex (#6-32)
2	322-0149	1	Lampholder	27	853-0003	1	Washer, Lock - ET (#6)
3	308-0002	1	Switch, Toggle (SPST)	28	356-0072	1	Capacitor, Fixed Electrolytic (4000 MFD, 30 VDC)
4	307-1157	3	Spring, Holddown - Relay	29	812-0063	2	Screw, Machine - Round Head (#6-32 x 1/2")
5	RELAY (12 VDC)			30	853-0003	2	Washer, Lock - ET (#6)
	307-1058	1	(Ignition)	31	356-0070	1	Clamp, Capacitor Mounting
	307-1058	1	(Start Disconnect)	32	870-0053	1	Nut, Hex (#10-32)
	307-1061	1	(Starter Protection)	33	850-0030	1	Washer, Lock - Spring (#10)
7	193-0243	1	Gauge - Oil Pressure (12 VDC)	34	332-0051	1	Clamp, Loop
8	193-0245	1	Gauge - Water Temperature (12 VDC)	35	HARNESS, WIRING - ENGINE CONTROL		
9	302-0061	1	Ammeter	338-1065	1	Includes parts marked †	
10	302-0749	1	£Tachometer - Electrical	ATTACHING HARDWARE FOR WIRING HARNESS			
11	193-0248	1	£Gauge - Oil Temperature (12 VDC)	812-0061	4	Screw, Machine - Round Head (#6-32 x 3/8")	
12	SWITCH, TOGGLE - SELECTOR			812-0066	6	Screw, Machine - Round Head (#6-32 x 3/4")	
	308-0138	1	Standard & Cycle Cranking Controls	853-0003	14	Washer, Lock - ET (#6)	
	308-0327	1	Penn State Controls	860-0006	10	Nut, Hex (#6-32)	
13	*LIGHT, INDICATOR (Lens Color & Legend Listed Below)			36	332-1043	1	†Jumper, Terminal
	322-0128	1	Red - Fault - 14 VDC	37	332-0795	1	†Block, Terminal - 16 Place
14	322-0136	1	*Light, Indicator - 14 VDC (Red Lens - No Legend)	38	332-0537	1	†Block, Terminal - 4 Place
15	518-0374	4	Fastener, Snap-In (Printed Circuit Boards)	39	323-0765	2	†Socket, Relay - 11 Place
16	PRINTED CIRCUIT BOARD ASSEMBLY			40	323-0764	1	†Socket, Relay - 8 Place
	300-0733	1	Standard Cranker (12 VDC)	41	332-1271	2	†Connector, Electrical - PC BD
	300-0714	1	Cycle Cranker (12 VDC)	42	332-1241	1	Strip, Marker - Terminal
17	PRINTED CIRCUIT BOARD ASSEMBLY			43	332-1239	1	Strip, Marker - Terminal
	300-0679	1	Engine Control Monitor - Standard				GROUND TERMINAL ASSEMBLY (Includes parts marked #)
	300-0730	1	Engine Control Monitor - Penn State	44	871-0010	2	#Nut, Hex - Brass (#10-32)
18	332-1276	4	Plug, Keying - PC Board	45	850-0030	1	#Washer, Lock - Spring (#10)
20	813-0098	2	Screw, Machine - Round Head (#10-32 x 3/8")	46	526-0062	2	#Washer, Flat - Brass (13/64" ID x 1/2" OD x 1/16" Thk)
21	850-0030	2	Washer, Lock - Spring (#10)	47	853-0008	1	#Washer, Lock - ET (#10)
22	526-0009	2	Washer, Flat (7/32" ID x 1/2" OD x 1/16" Thk)	48	856-0003	1	#Washer, Lock - EIT (#10)
23	856-0003	2	Washer, Lock - EIT (#10)	49	815-0203	1	#Screw, Machine - Round Head, Brass (#10-32 x 7/8")
24	307-1031	1	Relay, Solenoid - Start (12 VDC)	50	815-0026	5	Screw, Machine - Truss Head (#10-32 x 3/8")
25	812-0061	1	Screw, Machine - Round Head (#6-32 x 3/8")	51	870-0053	1	Nut, Hex (#10-32)
				52	850-0030	1	Washer, Lock - Spring (#10)
				53	856-0003	1	Washer, Lock - EIT (#10)
				54	PANEL, CONTROL - ENGINE		
					301-3165	1	With Three Gauge Mtg. Holes
					301-3286	1	With Four Gauge Mtg. Holes
					301-3396	1	With Five Gauge Mtg. Holes
					301-3253	1	Bracket, Mounting Engine Control

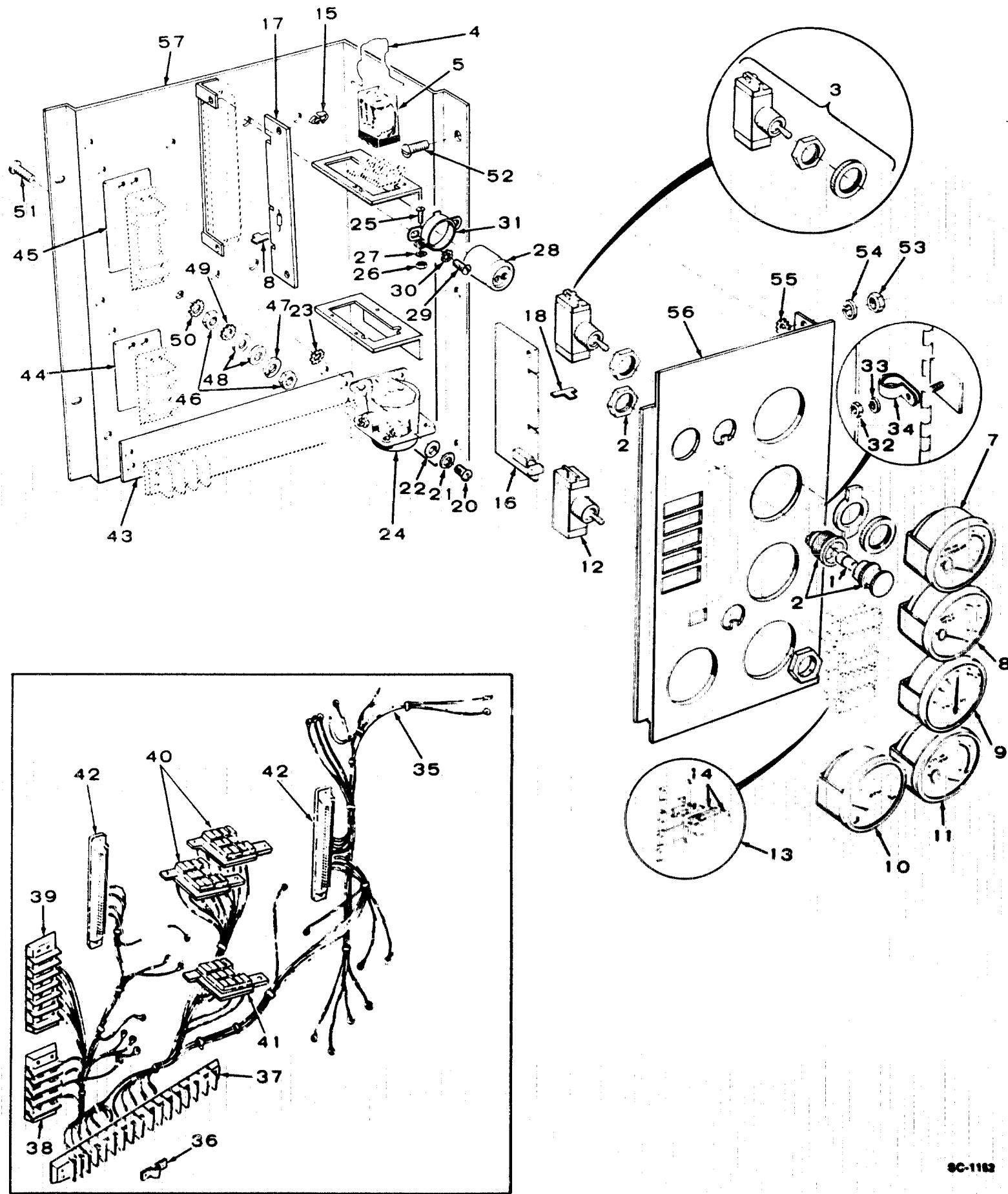
* - NOTE: For lamp replacement order 322-0136 remove and discard plain red lens, install lens with legend from burned out light — lights snap in and out of panel.

£ - Optional items used with Engine Mounted Senders.

† - Parts includes in Wiring Harness

- Parts includes in Ground Terminal Assembly

**ENGINE CONTROL WITH FIVE FAULT LIGHTS
(12 VDC)**



ENGINE CONTROL WITH FIVE FAULT LIGHTS (12 VDC)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	322-0004	1	Lamp Incandescent (12 VDC)	26	860-0006	1	Nut, Hex (#6-32)
2	322-0149	1	Lampholder	27	853-0003	1	Washer, Lock - ET (#6)
3	308-0002	1	Switch, Toggle (SPST)	28	356-0072	1	Capacitor, Fixed Electrolytic (4000 MFD, 30 VDC)
4	307-1157	3	Spring, Holdown - Relay	29	812-0063	2	Screw, Machine - Round Head (#6-32 x 1/2")
5	RELAY (12 VDC)			30	853-0003	2	Washer, Lock - ET (#6)
	307-1058	1	(Ignition)	31	356-0070	1	Clamp, Capacitor Mounting
	307-1058	1	(Start Disconnect)	32	870-0053	1	Nut, Hex (#10-32)
	307-1061	1	(Starter Protection)	33	850-0030	1	Washer, Lock - Spring (#10)
7	193-0243	1	Gauge - Oil Pressure (12 VDC)	34	332-0051	1	Clamp, Loop
8	193-0245	1	Gauge - Water Temperature (12 VDC)	35	HARNESS, WIRING - ENGINE CONTROL		
9	302-0061	1	Ammeter	338-1056	1	Includes Parts Marked †	
10	302-0749	1	Tachometer - Electrical	ATTACHING HARDWARE FOR WIRING HARNESS			
11	193-0248	1	Gauge - Oil Temperature (12 VDC)	812-0063	6	Screw, Machine - Round Head (#6-32 x 1/2")	
12	SWITCH, TOGGLE - SELECTOR			812-0066	6	Screw, Machine - Round Head (#6-32 x 3/4")	
	308-0138	1	Standard & Cycle Cranking Controls	853-0003	14	Washer, Lock - ET (#6)	
13	LIGHT, INDICATOR-14 VDC (Lens Color & Legend Listed Below)			860-0006	10	Nut, Hex (#6-32)	
	322-0107	1	Red - OVERCRANK	36	332-1043	1	†Jumper, Terminal
	322-0111	1	Red - OVERSPEED	37	332-0795	1	†Block, Terminal - 20 Place
	322-0108	1	Red - LO OIL PRESS	38	332-0537	1	†Block, Terminal - 4 Place
	322-0109	1	Red - HI ENG TEMP	39	332-0699	1	†Block, Terminal - 6 Place
	322-0110	2	Red - LO ENG TEMP	40	323-0765	2	†Socket, Relay - 11 Place
14	322-0136	1	Light, Indicator - 14 VDC (Red Lens - No Legend)	41	323-0764	2	†Socket, Relay - 8 Place
15	518-0374	4	Fastener, Snap-In (Printed Circuit Boards)	42	332-1271	1	†Connector, Electrical - PC BD
16	PRINTED CIRCUIT BOARD ASSEMBLY			43	332-1559	1	Strip, Marker - Terminal
	300-0733	1	Standard Cranker (12 VDC)	44	332-1239	1	Strip, Marker - Terminal
	300-0714	1	Cycle Cranker (12 VDC)	45	332-1240	1	Strip, Marker - Terminal
17	PRINTED CIRCUIT BOARD ASSEMBLY						GROUND TERMINAL ASSEMBLY (Includes Parts Marked #)
	300-0681	1	Engine Control Monitor - Standard	46	871-0010	2	#Nut, Hex - Brass (#10-32)
18	332-1276	4	Plug, Keying - PC Board	47	850-0030	1	#Washer, Lock - Spring (#10)
20	813-0098	2	Screw, Machine - Round Head (#10-32 x 3/8")	48	526-0062	2	#Washer, Flat - Brass (13/64" ID x 1/2" OD x 1/16" Thk)
21	850-0030	2	Washer, Lock - Spring (#10)	49	853-0008	1	#Washer, Lock - ET (#10)
22	526-0009	2	Washer, Flat (7/32" ID x 1/2" OD x 1/16" Thk)	50	856-0003	1	#Washer, Lock - EIT (#10)
23	856-0003	2	Washer, Lock - EIT (#10)	51	815-0203	1	#Screw, Machine - Round Head, Brass (#10-32 x 7/8")
24	307-1031	1	Relay, Solenoid - Start (12 VDC)	52	815-0026	5	Screw, Machine - Truss Head (#10-32 x 3/8")
25	812-0061	1	Screw, Machine - Round Head (#6-32 x 3/8")	53	870-0053	1	Nut, Hex (#10-32)
				54	850-0030	1	Washer, Lock - Spring (#10)
				55	856-0003	1	Washer, Lock - EIT (#10)
				56	PANEL, CONTROL - ENGINE		
				301-3267	1	With Three Gauge Mtg. Holes	
				301-3286	1	With Four Gauge Mtg. Holes	
				301-3166	1	With Five Gauge Mtg. Holes	
				57	301-3253	1	Bracket, Mounting Engine Control

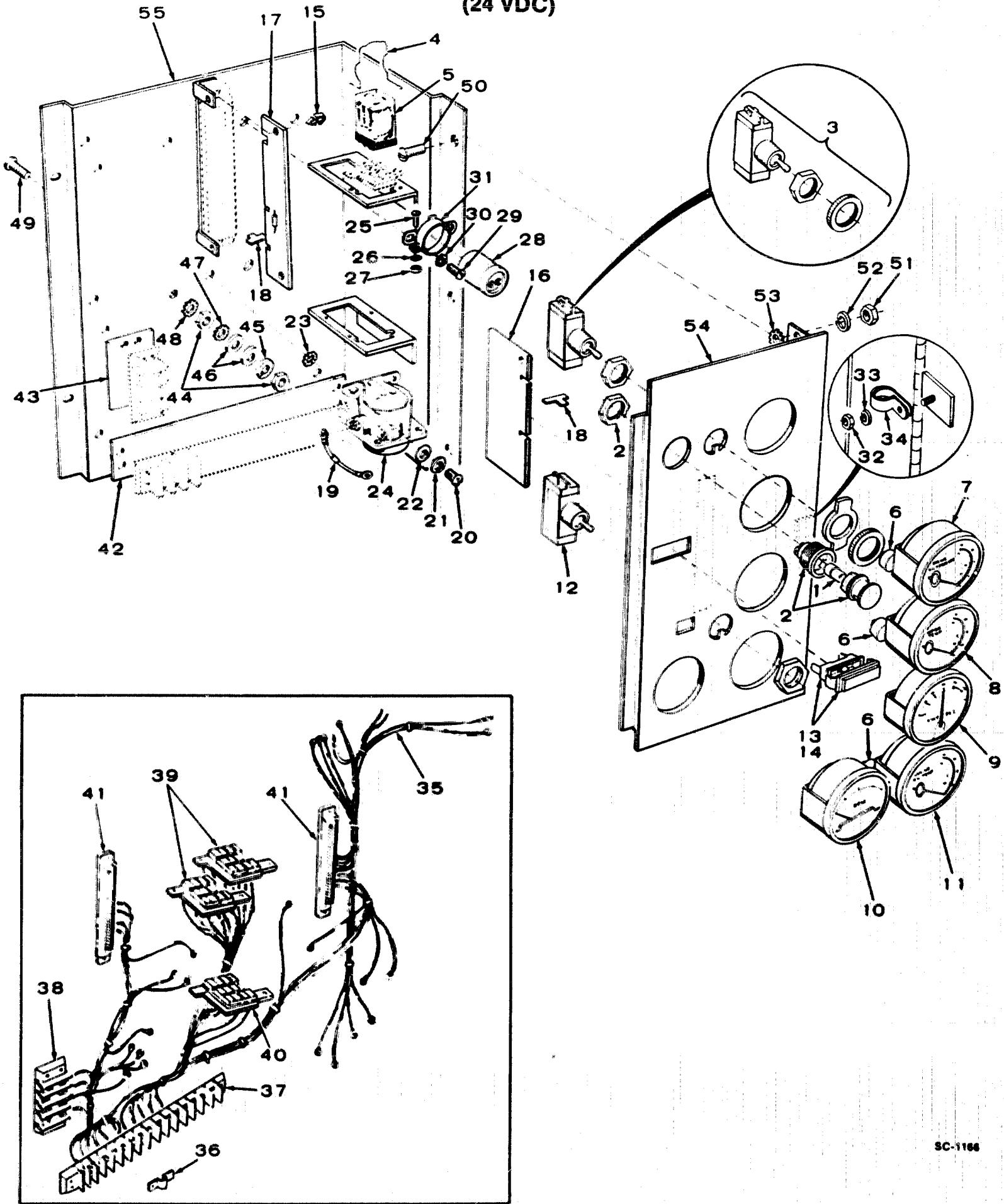
* - NOTE: For lamp replacement order 322-0136 remove and discard plain red lens, install lens with legend from burned out light — lights snap in and out of panel.

£ - Optional items used with Engine Mounted Senders

† - Parts included in Wiring Harness

- Parts included in Ground Terminal Assembly

**ENGINE CONTROL WITH ONE FAULT LIGHT
(24 VDC)**



ENGINE CONTROL WITH ONE FAULT LIGHT (24 VDC)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	322-0017	1	Lamp Incandescent (24 VDC)	26	860-0006	1	Nut, Hex (#6-32)
2	322-0149	1	Lampholder	27	853-0003	1	Washer, Lock - ET (#6)
3	308-0002	1	Switch, Toggle (SPST)	28	356-0072	1	Capacitor, Fixed, Electrolytic (4000 MFD, 30 VDC)
4	307-1157	3	Spring, Holddown - Relay	29	812-0063	2	Screw, Machine - Round Head (#6-32 x 1/2")
5	RELAY (24 VDC)			30	853-0003	2	Washer, Lock - ET (#6)
	307-1056	1	(Ignition)	31	356-0070	1	Clamp, Capacitor Mounting
	307-1056	1	(Start Disconnect)	32	870-0053	1	Nut, Hex (#10-32)
	307-1061	1	(Starter Protection)	33	850-0030	1	Washer, Lock - Spring (#10)
6	193-0250	3	Resistor - Gauge	34	332-0051	1	Clamp, Loop
7	193-0243	1	Gauge - Oil Pressure (12 VDC)	35	HARNESS, WIRING - ENGINE CONTROL		
8	193-0245	1	Gauge - Water Temperature (12 VDC)	338-1065	1	Includes Parts Marked †	
9	302-0061	1	Ammeter	ATTACHING HARDWARE FOR WIRING HARNESS			
10	302-0749	1	£Tachometer - Electrical	812-0061	4	Screw Machine - Round Head (#6-32 x 3/8")	
11	193-0248	1	£Gauge - Oil Temperature (12 VDC)	812-0066	6	Screw, Machine - Round Head (#6-32 x 3/4")	
12	SWITCH, TOGGLE - SELECTOR			853-0003	14	Washer, Lock - ET (#6)	
	308-0138	1	Standard & Cycle Cranking Controls	860-0006	10	Nut, Hex (#6-32)	
	308-0327	1	Penn State Controls	36	332-1043	1	†Jumper, Terminal
13	*LIGHT, INDICATOR (Lens Color & Legend Listed Below)			37	332-0795	1	†Block, Terminal - 16 Place
	322-0129	1	Red - Fault - 28 VDC	38	332-0537	1	†Block, Terminal - 4 Place
14	322-0137	1	*Light, Indicator - 28 VDC (Red Lens - No Legend)	39	323-0765	2	†Socket, Relay - 11 Place
15	518-0374	4	Fastener, Snap-In (Printed Circuit Boards)	40	323-0764	1	†Socket, Relay - 8 Place
16	PRINTED CIRCUIT BOARD ASSEMBLY			41	332-1271	2	†Connector, Electrical - PC BD
	300-0751	1	Standard Cranker (24 VDC)	42	332-1241	1	Strip, Marker - Terminal
	300-0715	1	Cycle Cranker (24 VDC)	43	332-1239	1	Strip, Marker - Terminal
17	PRINTED CIRCUIT BOARD ASSEMBLY						GROUND TERMINAL ASSEMBLY (Includes Parts Marked #)
	300-0680	1	Engine Control Monitor - Standard	44	871-0010	2	#Nut, Hex - Brass (#10-32)
	300-0731	1	Engine Control Monitor - Penn State	45	850-0030	1	#Washer, Lock - Spring (#10)
18	332-1276	4	Plug, Keying - PC Board	46	526-0062	2	#Washer, Flat - Brass (13/64" ID 1/2" OD x 1/16" Thk)
19	357-0018	1	Diode, with Terminals	47	853-0008	1	#Washer, Lock - ET (#10)
20	813-0098	2	Screw, Machine - Round Head (#10-32 x 3/8")	48	856-0003	1	#Washer, Lock - ET (#10)
21	850-0030	2	Washer, Lock - Spring (#10)	49	815-0203	1	#Screw, Machine - Round head, Brass (#10-32 x 7/8")
22	526-0009	2	Washer, Flat (7/32" ID x 1/2" OD x 1/16" Thk)	50	815-0026	5	Screw, Machine - Truss Head (#10-32 x 3/8")
23	856-0003	2	Washer, Lock - EIT (#10)	51	870-0053	1	Nut, Hex (#10-32)
24	307-0061	1	Relay, Solenoid - Start (24 VDC)	52	850-0030	1	Washer, Lock - Spring (#10)
25	812-0061	1	Screw, Machine - Round Head (#6-32 x 3/8")	53	856-0003	1	Washer, Lock - EIT (#10)
				54	PANEL CONTROL - ENGINE		
				301-3165	1	With Three Gauge Mtg. Holes	
				301-3286	1	With Four Gauge Mtg. Holes	
				301-3396	1	With Five Gauge Mtg. Holes	
				55	301-3253	1	Bracket, Mounting Engine Control

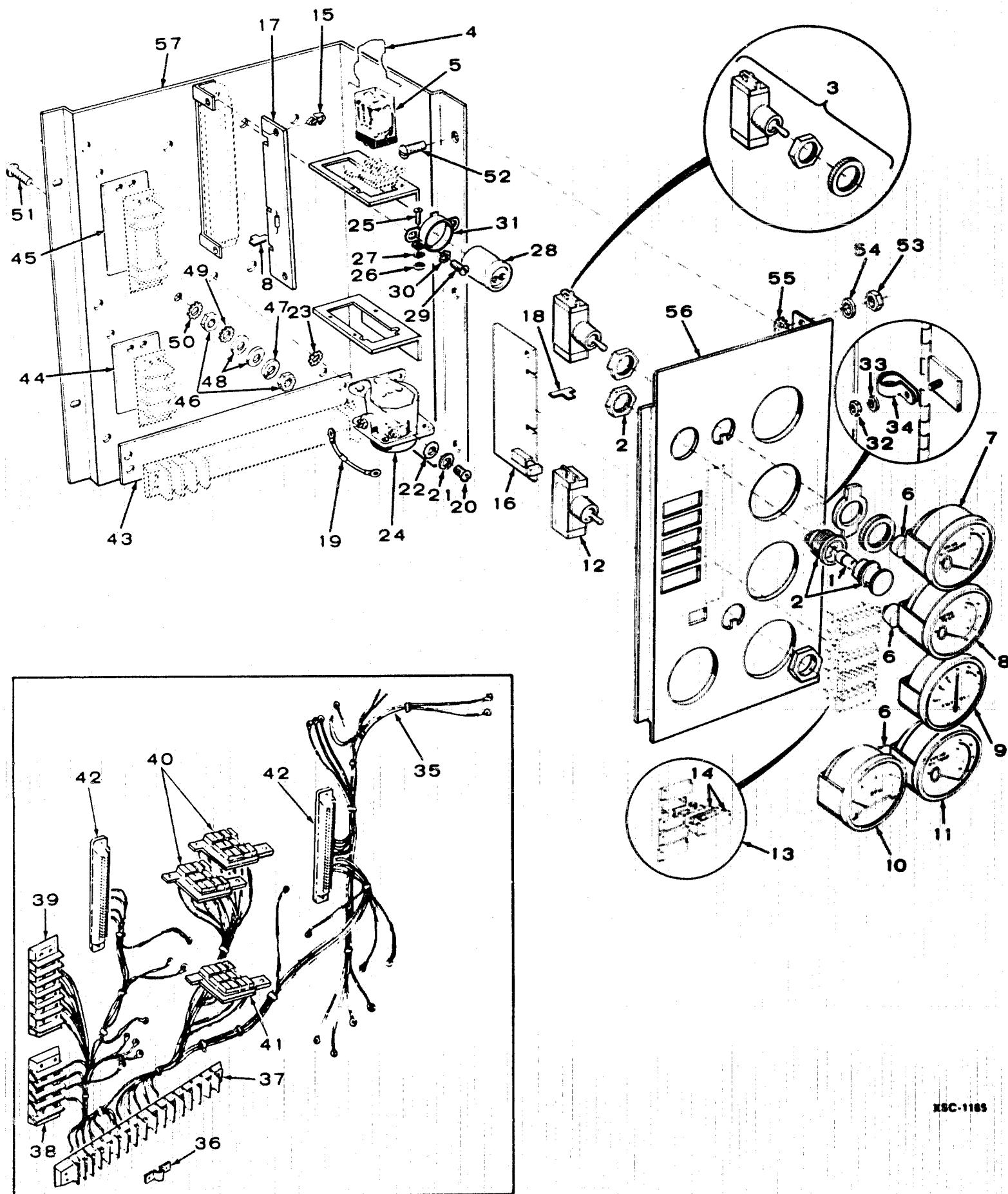
* - NOTE: For lamp replacement order 322-0137 remove and discard plain red lens, install lens with legend from burned out light —

£ - Optional items used with Engine Mounted Senders.

+ - Parts included in Wiring Harness.

- Parts included in Ground Terminal Assembly.

**ENGINE CONTROL WITH FIVE FAULT LIGHTS
(24 VDC)**



D8

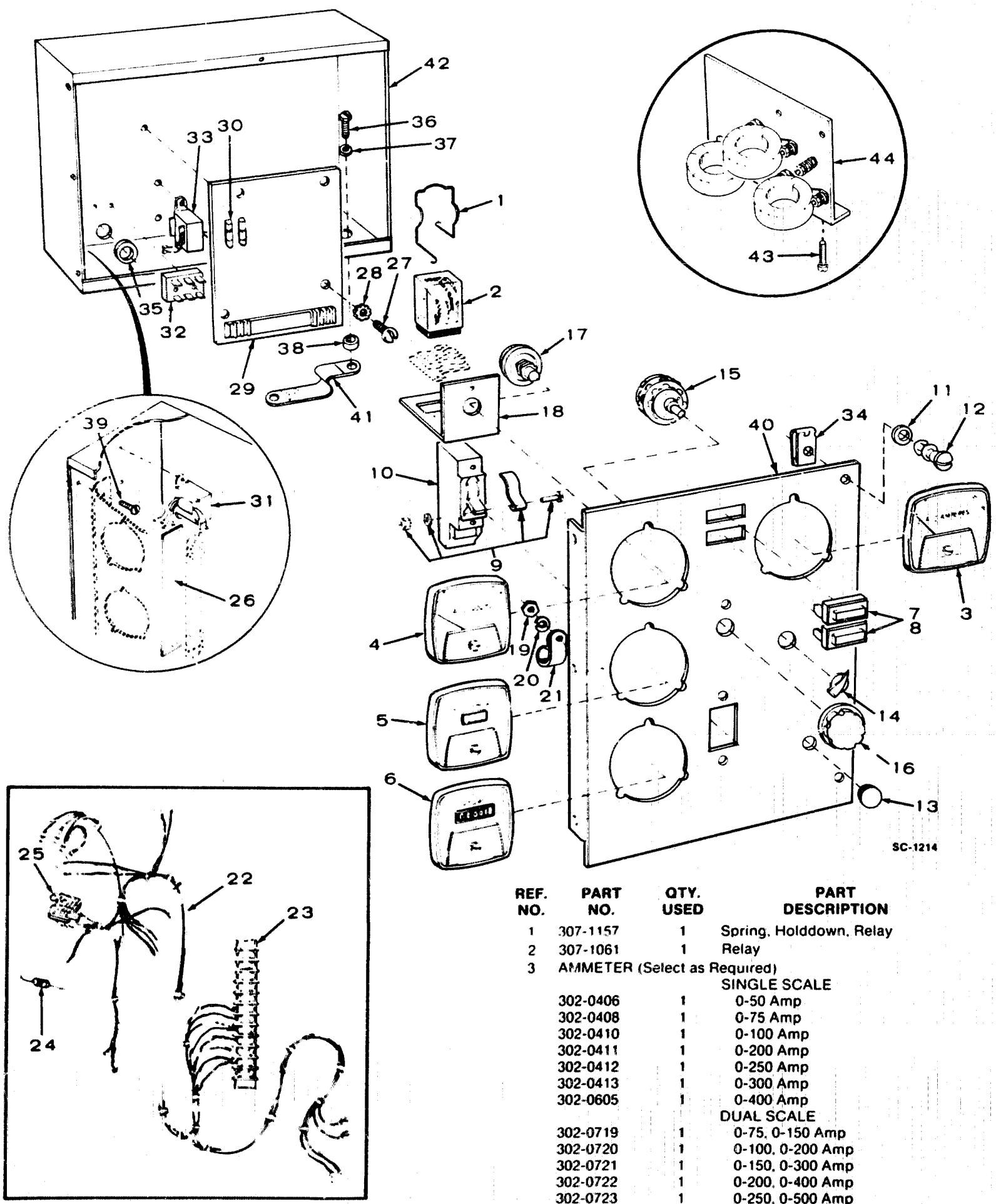
KSC-1185

ENGINE CONTROL WITH FIVE FAULT LIGHTS (24 VDC)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	
1	322-0017	1	Lamp Incandescent (24 VDC)	26	860-0006	1	Nut, Hex (#6-32)	
2	322-0149	1	Lampholder	27	853-0003	1	Washer, Lock - ET (#6)	
3	308-0002	1	Switch, Toggle (SPST)	28	356-0072	1	Capacitor, Fixed, Electrolytic (4000 MFD, 30 VDC)	
4	307-1157	3	Spring, Holdown - Relay	29	812-0063	2	Screw, Machine - Round Head (#6-32 x 1/2")	
5	RELAY (24 VDC)			30	853-0003	2	Washer, Lock - ET (#6)	
	307-1056	1	(Ignition)	31	356-0070	1	Clamp, Capacitor Mounting	
	307-1056	1	(Start Disconnect)	32	870-0053	1	Nut, Hex (#10-32)	
	307-1061	1	(Starter Protection)	33	850-0030	1	Washer, Lock - Spring (#10)	
6	193-0250	3	Resistor - Gauge	34	332-0051	1	Clamp, Loop	
7	193-0243	1	Gauge - Oil Pressure (12 VDC)	35	HARNESS, WIRING - ENGINE CONTROL			
8	193-0245	1	Gauge - Water Temperature (12 VDC)	338-1066	1	Includes Parts Marked t		
9	302-0061	1	Ammeter	ATTACHING HARDWARE FOR WIRING HARNESS				
10	302-0749	1	tTachometer - Electrical	812-0063	6	Screw, Machine - Round Head (#6-32 x 1/2")		
11	193-0248	1	tGauge - Oil Temperature (12 VDC)	812-0066	6	Screw, Machine - Round Head (#6-32 x 3/4")		
12	SWITCH, TOGGLE - SELECTOR			853-0003	14	Washer, Lock - ET (#6)		
	308-0138	1	Standard & Cycle Cranking Controls	860-0006	10	Nut, Hex (#6-32)		
	308-0327	1	Penn State Controls	36	332-1043	1	tJumper Terminal	
13	*LIGHT, INDICATOR - 28 VDC (Lens Color & Legend Listed Below)			37	332-0795	1	tBlock, Terminal - 20 Place	
	322-0119	1	Red - OVERCRANK	38	332-0537	1	tBlock, Terminal - 4 Place	
	322-0123	1	Red - OVERSPEED	39	332-0699	1	tBlock, Terminal - 6 Place	
	322-0120	1	Red - LO OIL PRESS	40	323-0765	2	tSocket, Relay - 11 Place	
	322-0121	1	Red - HI ENG TEMP	41	323-0764	2	tSocket, Relay - 8 Place	
	322-0122	1	Red - LO ENG TEMP	42	332-1271	1	Connector, Electrical - PC BD	
14	322-0137	1	*Light, Indicator - 28 VDC (Red Lens - No Legend)	43	332-1559	1	Strip, Marker - Terminal	
15	518-0374	4	Fastener, Snap-In (Printed Circuit Boards)	44	332-1239	1	Strip, Marker - Terminal	
16	PRINTED CIRCUIT BOARD ASSEMBLY			45	332-1240	1	Strip, Marker - Terminal	
	300-0751	1	Standard Cranker (24 VDC)				GROUND TERMINAL ASSEMBLY (Includes Parts Marked #)	
	300-0715	1	Cycle Cranker (24 VDC)	46	871-0010	2	#Nut, Hex - Brass (#10-32)	
17	PRINTED CIRCUIT BOARD ASSEMBLY			47	850-0030	1	#Washer, Lock - Spring (#10)	
	300-0682	1	Engine Control Monitor - Standard	48	526-0062	2	#Washer, Flat - Brass (13/64" ID x 1/2" OD x 1/16" Thk)	
18	332-1276	4	Plug, Keying - PC Board	49	853-0008	1	#Washer, Lock - ET (#10)	
19	357-0018	1	Diode, with Terminals	50	856-0003	1	#Washer, Lock - EIT (#10)	
20	813-0098	2	Screw, Machine - Round Head (#10-32 x 3/8")	51	815-0203	1	#Screw, Machine - Round Head, Brass (#10-32 x 7/8")	
21	850-0030	2	Washer, Lock - Spring (#10)	52	815-0026	5	Screw, Machine - Truss Head (#10-32 x 3/8")	
22	526-0009	2	Washer, Flat (7/32" ID x 1/2" OD x 1/16" Thk)	53	870-0053	1	Nut, Hex (#10-32)	
23	856-0003	2	Washer, Lock - EIT (#10)	54	850-0030	1	Washer, Lock - Spring (#10)	
24	307-0061	1	Relay, Solenoid - Start (24 VDC)	55	856-0003	1	Washer, Lock - EIT (#10)	
25	812-0061	1	Screw, Machine - Round Head (#6-32 x 3/8")	56	PANEL, CONTROL - ENGINE			
				301-3267	1	With Three Gauge Mtg. Holes		
				301-3286	1	With Four Gauge Mtg. Holes		
				301-3166	1	With Five Gauge Mtg. Holes		
				301-3253	1	Bracket, Mounting - Engine Control		

- * - NOTE: For lamp replacement order 322-0137 remove and discard plain red lens, install lens with legend from burned out light — lights snap in and out of panel.
- t - Optional items used with Engine Mounted Senders.
- f - Parts included in Wiring Harness.
- # - Parts included in Ground Terminal Assembly.

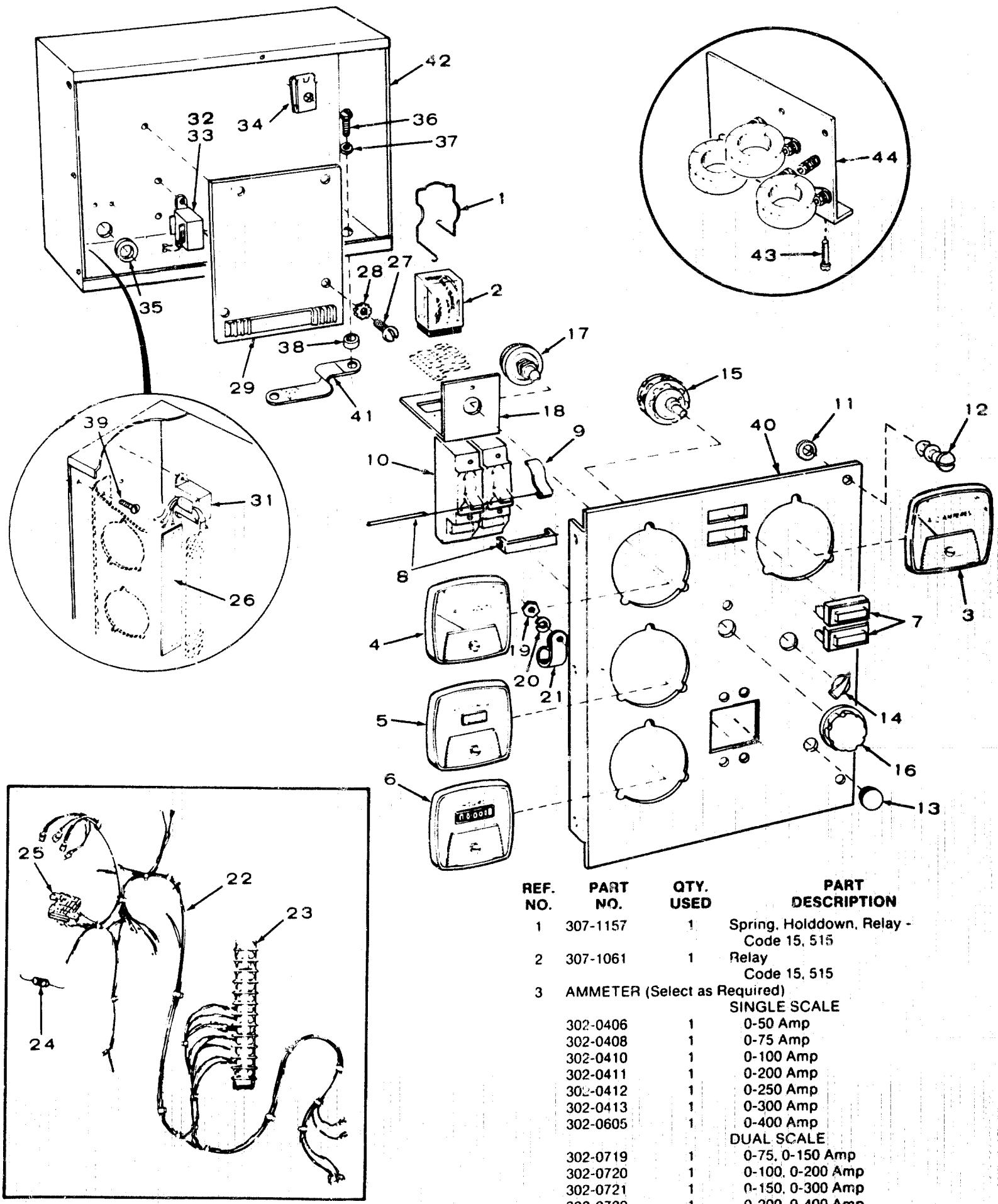
GENERATOR CONTROL



GENERATOR CONTROL

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	
4	VOLTMETER (Select as Required)			23	BLOCK, TERMINAL (Select as Required)			
	SINGLE SCALE			332-0607	1	12 Place		
	302-0421	1	0-300 Volt	332-0795	1	16 Place		
	302-0422	1	0-600 Volt	350-0556	1	Resistor, Fixed, Composition (47K Ohms, 1/2 Watt) - Code 15, 515		
	302-0612	1	0-500 Volt	25	323-0765	1	Socket, Relay - 11 Place - Code 15, 515	
	302-0779	1	0-750 Volt	26	STRIP, MARKER (Select as Required)			
	DUAL SCALE			332-1242	1	16 Place		
	302-0718	1	0-300, 0-600 Volt	332-1248	1	12 Place		
5	METER, FREQUENCY (Select as Required)			27	812-0065	4	Screw, Machine - Round Head (#6-32 x 5/8")	
	REED TYPE			28	853-0003	4	Washer, Lock - ET (#6)	
	302-0213	1	115 VAC, 60 Hz	29	REGULATOR, VOLTAGE (Select as Required) NOTE: REGULATOR MATCHED TO VOLTAGE TRANSFORMER, Item #31. (See Separate Parts Catalog #900-0234 for Components)			
	302-0221	1	230 VAC, 60 Hz	332-1268	1	Used with 120 VAC Input Signal		
	302-0234	1	115 VAC, 50 Hz	332-1956	1	Used with 240 VAC Input Signal		
	302-0256	1	230 VAC, 50 Hz	30	321-0204	2	Fuse, Cartridge (1/4 Amp) - Part of 332-1956 Voltage Regulator	
	POINTER TYPE			31	TRANSFORMER, VOLTAGE (Select as Required) NOTE: Transformer Matched to Voltage Regulator, Item #29			
	302-0809	1	120 VAC, 60 Hz	315-0342	1	120 VAC		
	302-0810	1	208 VAC, 60 Hz	315-0431	1	240 VAC		
	302-0811	1	240 VAC, 60 Hz				ATTACHING PARTS FOR TRANSFORMER	
6	METER, TIME TOTALIZING (Select as Required)			812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")		
	302-0466	1	60 Hz	32	853-0003	2	Washer, Lock - ET (#6)	
	302-0469	1	50 Hz	305-0675	1	Rectifier, Bridge		
7	LIGHT, INDICATOR - 125 VAC (Lens Color & Legend Listed Below)			812-0070	2	Screw, Machine - Round Head (#6-32 x 1-1/4")		
	322-0130	1	Red - Lower Scale	850-0020	2	Washer Lock - Spring (#6)		
	322-0131	1	Red - Upper Scale	33	315-0384	1	Reactor	
8	322-0178	1	Light, Indicator - 125 VAC (Replacement) - Discard Lens - Used Lens From Original Light	812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")		
9	320-0307	1	Lock - Circuit Breaker Handle (Penn State Sets)	853-0003	2	Washer, Lock - ET (#6)		
	ATTACHING HARDWARE FOR LOCK			34	406-0332	2	Receptacle, Turnbutton Fastener	
	815-0203	1	Screw, Machine - Round Head (#10-32 x 7/8")	35	508-0001	4	Grommet, Rubber	
	854-0010	1	Washer, Lock - IT (#10)	36	800-0045	4	Screw, Cap - Hex Head (5/16-18 x 3/8")	
	871-0010	1	Nut, Hex (#10-32)	37	850-0045	4	Washer, Lock - Spring (5/16")	
10	320-0431	1	Circuit Breaker	38	402-0070	4	Dampener, Vibration	
	ATTACHING HARDWARE FOR CIRCUIT BREAKER			39	815-0026	3	Screw, Machine - Truss Head (#10-32 x 3/8")	
	812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")	40	PANEL CONTROL		Sets Without Meter Panel	
	850-0020	2	Washer, Lock - Spring (#6)	301-3822	1	Code 3		
	815-0203	1	Screw, Machine - Round Head, Brass (#10-32 x 7/8")	301-3821	1	Code 6D, 7, 9X		
	871-0010	1	Nut, Hex - Brass (#10-32)	301-3274	1	Code 15, 515		
	853-0008	1	Washer, Lock - ET (#10)	41	337-0049	1	Strap, Ground	
	526-0049	1	Washer, Flat - Brass (13/64"ID x 7/16"OD x 132"Thk)				ATTACHING PARTS FOR STRAP	
11	406-0334	2	Clip, Retaining - Turnbutton Fastener	800-0045	1	Screw, Cap - Hex Head (5/16-18 x 3/8")		
12	406-0333	2	Stud, Turnbutton Fastener	850-0045	1	Washer, Lock - Spring (5/16")		
13	517-0131	1	Plug, Plastic	856-0008	2	Washer, Lock - EIT (5/16")		
14	303-0076	1	Knob, Pointer	862-0015	1	Nut, Hex (5/16-18)		
15	308-0284	1	Switch, Selector	42	301-3158	1	Box, Control	
16	303-0032	1	Knob	43	821-0010	2	Screw, Self-locking - Hex Washer Head (1/4-20 x 1/2")	
17	303-0170	1	Rheostat (35K Ohms, 25 Watt)	44	CURRENT TRANSFORMER ASSEMBLY (See Separate Figure For Parts) - NOTE: Assembly is Located Behind the Control Box.			
18	301-3244	1	Bracket, Mounting, Relay - Code 15, 515					
19	870-0053	1	Nut, Hex (#10-32)					
20	850-0030	1	Washer, Lock - Spring (#10)					
21	332-0051	1	Clamp, Loop					
22	HARNESS, WIRING - GENERATOR CONTROL							
	Sets Without Meter Panel							
	338-0765	1	Code 3					
	338-0764	1	Code 15, 515					
	0766	1	Code 6D, 7, 9X					
	Sets With Meter Panel							
	338-0735	1	Code 3	850-0045	1	Washer, Lock - Spring (5/16")		
	338-0730	1	Code 15, 515	856-0008	2	Washer, Lock - EIT (5/16")		
	338-0759	1	Code 6D, 7, 9X	862-0015	1	Nut, Hex (5/16-18)		
	ATTACHING HARDWARE FOR WIRING HARNESS			42	301-3158	1	Box, Control	
	812-0061	2	Screw, Machine - Round Head (#6-32 x 3/8")	43	821-0010	2	Screw, Self-locking - Hex Washer Head (1/4-20 x 1/2")	
	812-0066	2	Screw, Machine - Round Head (#6-32 x 3/4")	44	CURRENT TRANSFORMER ASSEMBLY (See Separate Figure For Parts) - NOTE: Assembly is Located Behind the Control Box.			
	850-0020	2	Washer, Lock - Spring (#6)					
	853-0003	4	Washer, Lock - ET (#6)					
	853-0006	2	Nut, Hex (#6-32)					

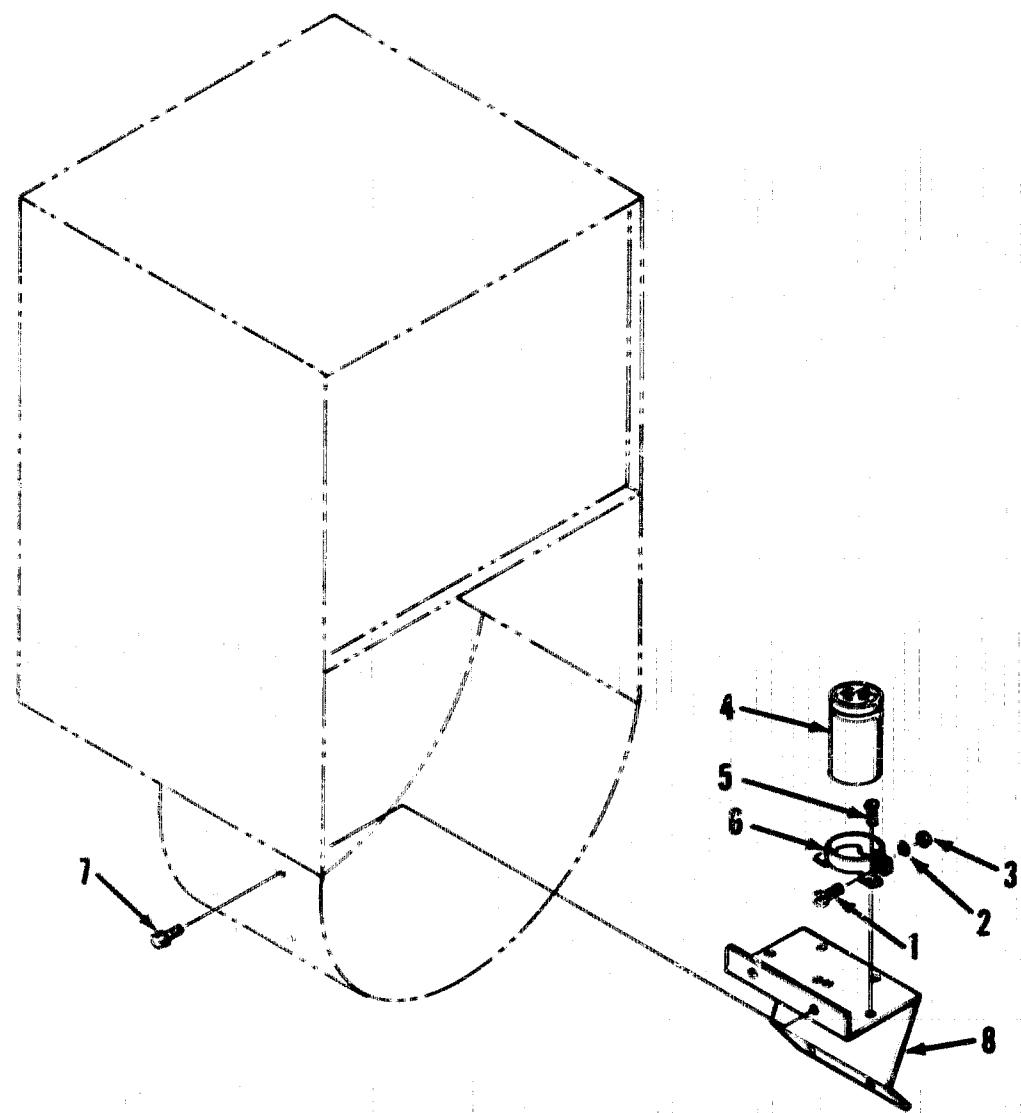
GENERATOR CONTROL (WITH SWITCHING REGULATOR)



GENERATOR CONTROL (WITH SWITCHING REGULATOR)

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	
4	VOLTMETER (Select as Required)		SINGLE SCALE	23	BLOCK, TERMINAL (Select as Required)			
	302-0421	1	0-300 Volt	332-0607		1	12 Place	
	302-0422	1	0-600 Volt	332-0795		1	16 Place	
	302-0612	1	0-500 Volt	350-0556		1	Resistor, Fixed, Composition (47K Ohms, 1/2 Watt) - Code 15, 515	
	302-0779	1	0-750 Volt	25	323-0765	1	Socket, Relay - 11 Place - Code 15, 515	
	302-0718	1	DUAL SCALE 0-300, 0-600 Volt	26	STRIP, MARKER (Select as Required)			
5	METER, FREQUENCY (Select as Required)		REED TYPE	332-1242		1	16 Place	
	302-0213	1	115 VAC, 60 Hz	332-1248		1	12 Place	
	302-0221	1	230 VAC, 60 Hz	27	812-0065	4	Screw, Machine - Round Head (#6-32 x 5/8")	
	302-0234	1	115 VAC, 50 Hz	28	853-0003	4	Washer, Lock - ET (#6)	
	302-0256	1	230 VAC, 50 Hz	29	REGULATOR, VOLTAGE (Requires 240 VAC Input Signal)			
	302-0809	1	120 VAC, 60 Hz	300-1928		1	Semi-Frequency Sensitive Type	
	302-0810	1	208 VAC, 60 Hz	300-1929		1	Voltage Sensitive Type	
	302-0811	1	240 VAC, 60 Hz	300-1930		1	Frequency Sensitive Type	
6	METER, TIME TOTALIZING (Select as Required)			31	315-0431	1	Transformer, Voltage (240 VAC Output Signal)	
	302-0466	1	60 Hz				ATTACHING PARTS FOR TRANSFORMER	
	302-0469	1	50 Hz	812-0061		2	Screw, Machine - Round Head (#6-32 x 3/8")	
7	LIGHT, INDICATOR - 125 VAC (Lens Color & Legend Listed Below)			32	853-0003	2	Washer, Lock - ET (#6)	
	322-0130	1	Red - Lower Scale	315-0343		1	Reactor	
	322-0131	1	Red - Upper Scale				ATTACHING PARTS FOR REACTOR	
	322-0178	1	Light, Indicator - 125 VAC (Amber Lens - No Legend)	812-0061		2	Screw, Machine - Round Head (#6-32 x 3/8")	
8	320-0202	1	Tie Bar - Circuit Breaker	853-0003		2	Washer, Lock - ET (#6)	
9	320-0307	1	Lock, Handle - Circuit Breaker (Used On Penn State Sets)	315-0343		1	Reactor	
10	320-0455	2	Circuit Breaker - 3 Amp, 240 Volt				ATTACHING PARTS FOR REACTOR	
	812-0061	4	ATTACHING HARDWARE FOR CIRCUIT BREAKER	812-0061		2	Screw, Machine - Round Head (#6-32 x 3/8")	
				853-0003		2	Washer, Lock - ET (#6)	
	850-0020	4		34	406-0332	2	Receptacle, Turnbutton Fastener	
	815-0203	2		35	508-0001	4	Grommet, Rubber	
				36	800-0045	4	Screw, Cap - Hex Head (5/16-18 x 3/8")	
	871-0010	2		37	850-0045	4	Washer, Lock - Spring (5/16")	
	853-0008	2		38	402-0070	4	Dampener, Vibration	
	526-0049	2		39	815-0026	3	Screw, Machine - Truss Head (#10-32 x 3/8")	
11	406-0334	2	Washer, Flat - Brass (13/64" ID x 7/16" OD x 1/32" Thk)				40	PANEL CONTROL
				301-3822		1	Sets Without Meter Panel	
				301-3821		1	Code 3	
				301-7078		1	Code 6D, 7, 9X	
							Code 15, 515	
							Sets With Meter Panel	
				301-3169		1	Code 3	
				301-3342		1	Code 6D, 7, 9X	
				301-6298		1	Code 15, 515	
				41	337-0049	1	Strap, Ground	
							ATTACHING PARTS FOR STRAP	
				800-0045		1	Screw, Cap - Hex Head (5/16-18 x 3/8")	
				850-0045		1	Washer, Lock - Spring (5/16")	
				856-0008		2	Washer, Lock - EIT (5/16")	
				862-0015		1	Nut, Hex (5/16-18)	
				42	301-3158	1	Box, Control	
				43	821-0010	2	Screw, Self-locking - Hex Washer Head (1/4-20 x 1/2")	
				44	CURRENT TRANSFORMER ASSEMBLY (See Separate Figure For Parts) - NOTE: Assembly is Located Behind the Control Box.			
							- NOTE: For lamp replacement order 322-0178. Remove and discard plain red lens, install lens with legend from burned out light -- lights snap in and out of panel.	
	338-0765	1	Code 3					
	338-0764	1	Code 15, 515					
	338-0766	1	Code 6D, 7, 9X					
	338-0735	1	Code 3					
	338-1469	1	Code 15, 515					
	338-0759	1	Code 6D, 7, 9X					
	812-0061	2	ATTACHING HARDWARE FOR WIRING HARNESS					
	812-0066	2	Screw, Machine - Round Head (#6-32 x 3/8")					
	850-0020	2	Screw, Machine - Round Head (#6-32 x 3/4")					
	853-0003	4	Washer, Lock - Spring (#6)					
	853-0006	2	Nut, Hex (#6-32)					

**CAPACITOR ASSEMBLY
USED WITH
SWITCHING VOLTAGE REGULATOR**

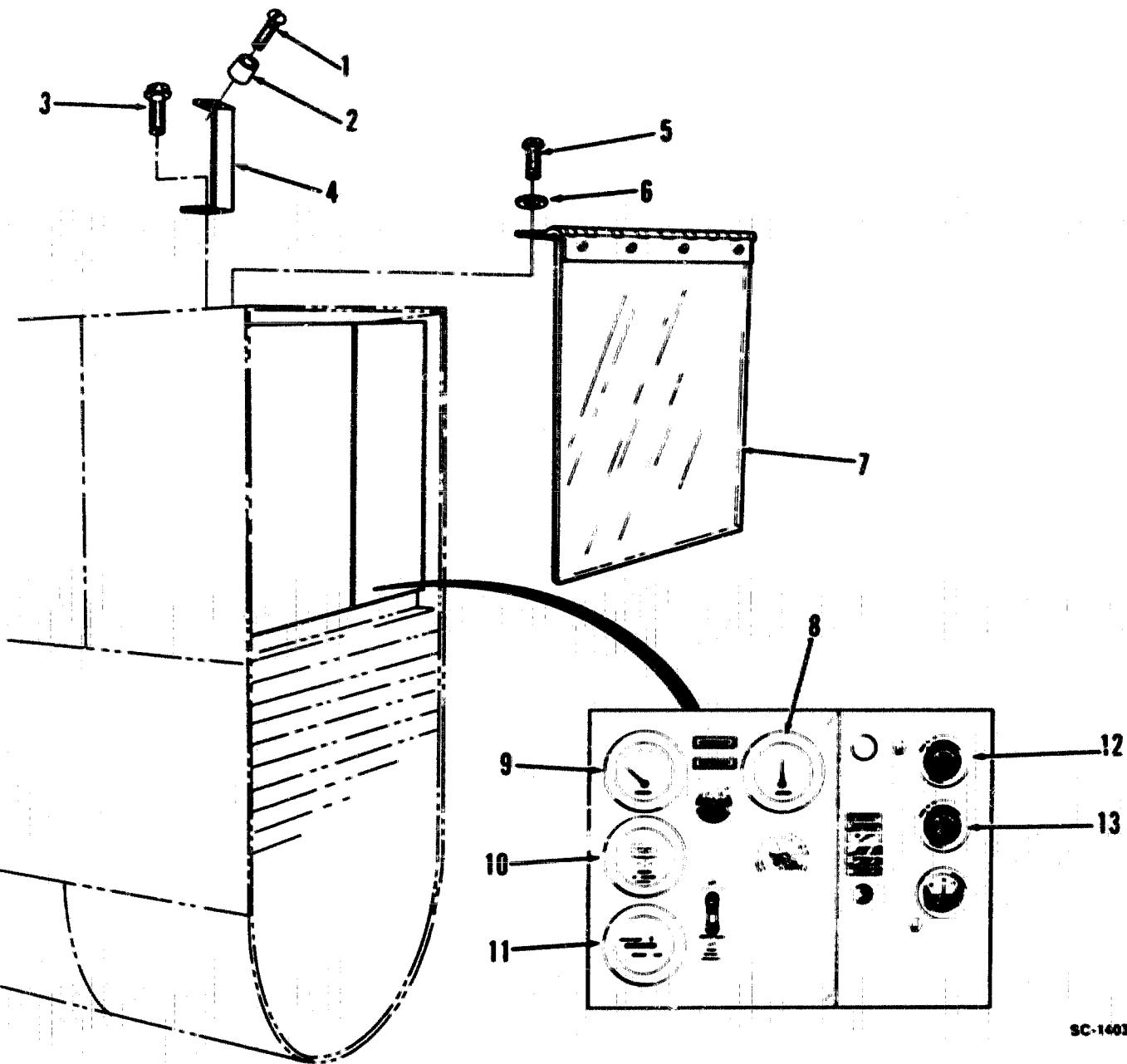


ES-1357

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	812-0078	2	Screw, Machine - Round Head (#8-32 x 7/16")
2	850-0025	2	Washer, Lock - Spring (#8)
3	861-0007	2	Nut, Square (#8-32)
4	356-0090	2	Capacitor, Fixed Electrolytic (1300 MFD)
5	812-0078	6	Screw, Machine - Round Head (#8-32 x 7/16")
6	356-0102	2	Clamp, Capacitor Mounting
7	821-0009	4	Screw, Self-Locking - Hex Washer Head (1/4-20 x 3/8")
8	356-0104	1	Bracket, Mounting - Capacitor

D14

**CONTROL - ENGINE/GENERATOR
RUGGEDIZED WITH PROTECTING
SHIELD**



SC-1403

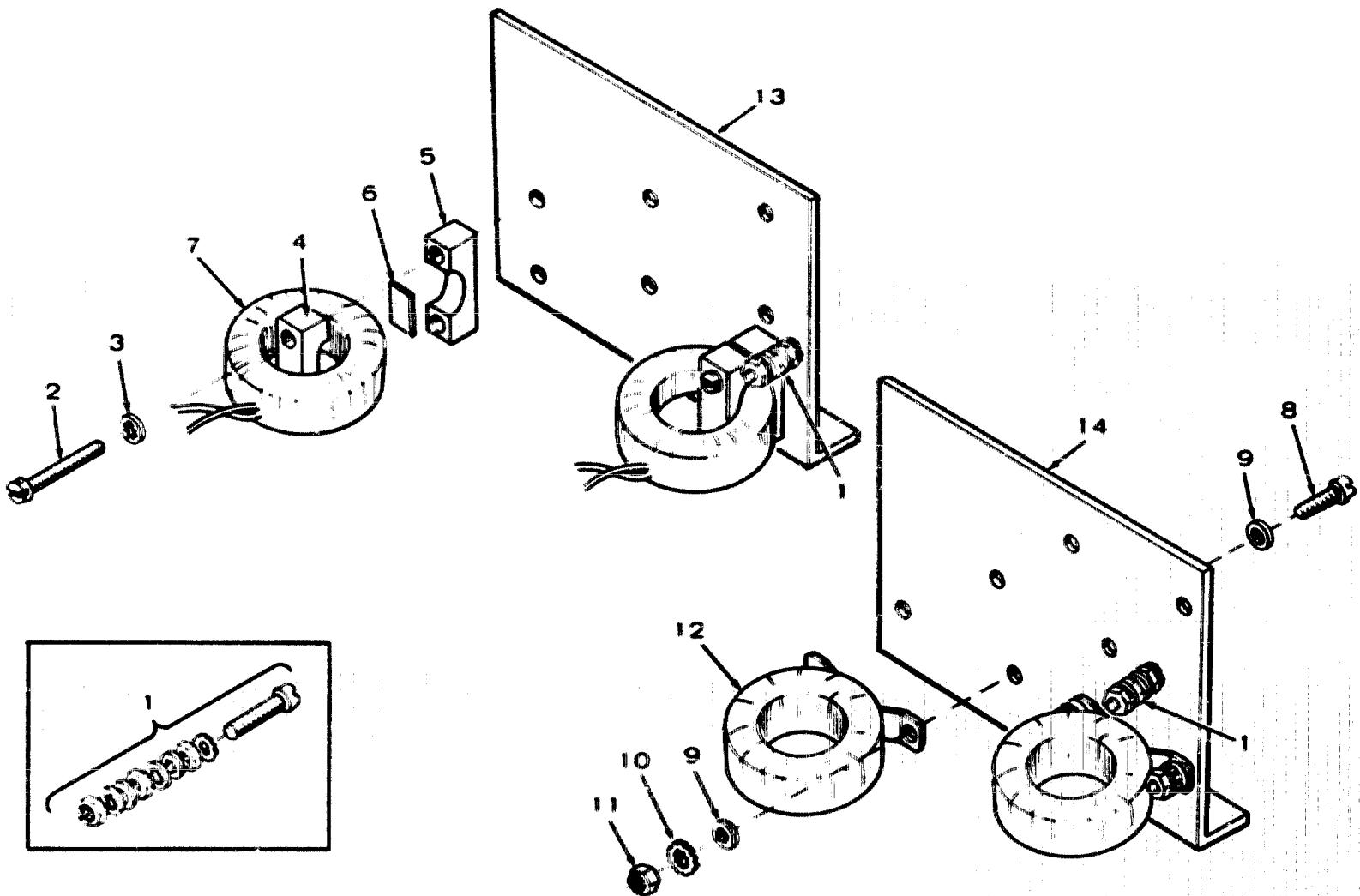
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	812-0063	2	Screw, Machine - Round Head (#6-32 x 1/2")
2	402-0029	2	Bumper, Rubber
3	821-0014	2	Screw, Self-locking - Hex Washer Head (5/16-18 x 1/2")
4	301-3482	2	Bracket
5	813-0098	5	Screw, Machine - Round Head (#10-32 x 3/8")
6	854-0010	5	Washer, Lock - Internal Tooth (#10)
7	301-3486	1	Cover, Protective

GENERATOR CONTROL - RUGGEDIZED
AMMETER - DUAL SCALE (Select as Required)
 302-0833 1 0-75, 0-150 AMPS
 302-0834 1 0-100, 0-200 AMPS
 302-0835 1 0-150, 0-300 AMPS
 302-0837 1 0-250, 0-500 AMPS
 302-0838 1 0-375, 0-750 AMPS

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
9	302-0839	1	Voltmeter - Dual Scale (0-300, 0-600 VOLTS)
10	METER, FREQUENCY - REED TYPE (Select as Required)	1	60 Hz
	302-0840	1	50 Hz
	302-0841	1	50 Hz
11	METER, TIME TOTALIZING (Select as Required)	1	60 Hz
	302-0817	1	50 Hz
	302-0816	1	50 Hz
ENGINE CONTROL - RUGGEDIZED			
12	193-0212	1	Gauge - Oil Pressure
13	193-0213	1	Gauge - Water Temperature

**E - For Standard components, refer to applicable
Illustrations and parts lists.**

CURRENT TRANSFORMER ASSEMBLY

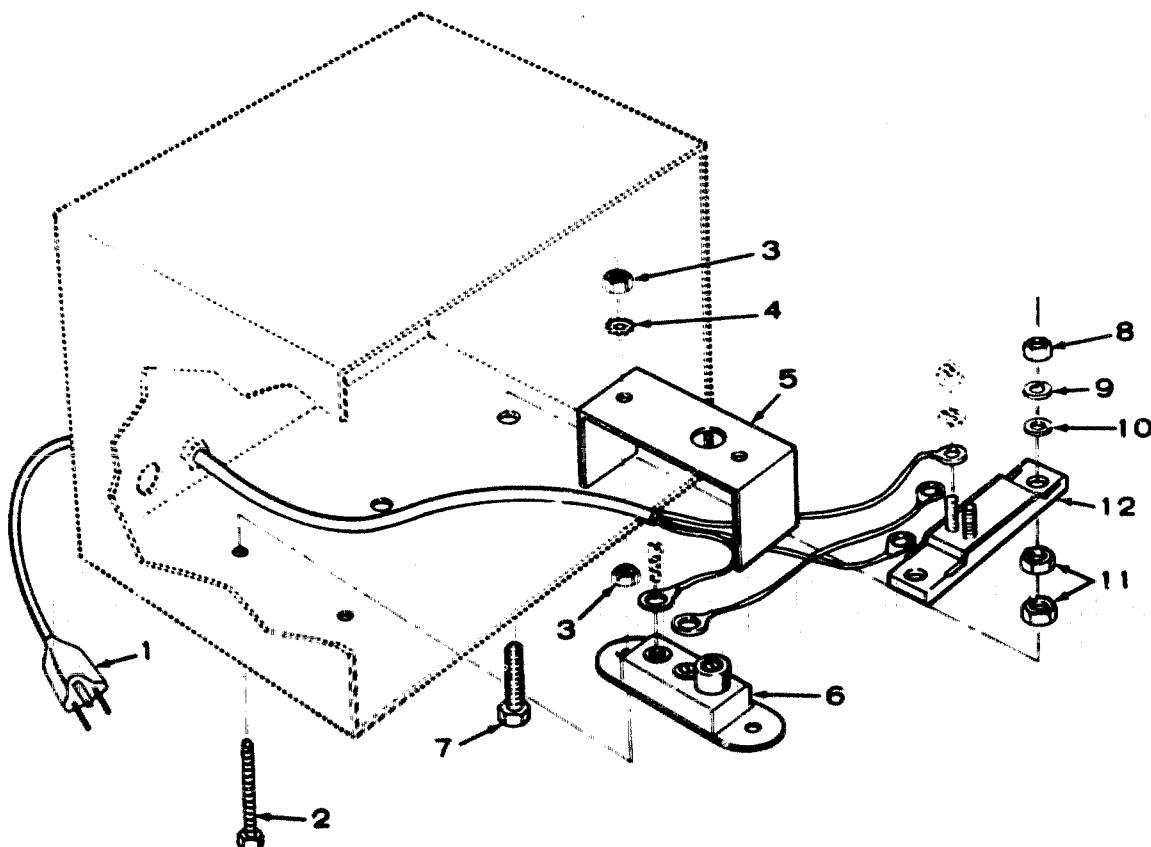


SC-1198

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
CURRENT TRANSFORMER ASSEMBLY (Select Components as Required)			
1	GROUND TERMINAL ASSEMBLY (Includes Following Items)		
815-0203	Screw, Machine - Round Head, Brass (#10-32 x 7-8")	1	
871-0010	Nut, Hex - Brass (#10-32)	3	
856-0003	Washer, Lock - EIT (#10)	1	
854-0010	Washer, Lock - IT (#10)	2	
526-0049	Washer, Flat - Brass (13/64" ID x 7/32" OD x 1-32" Thk)	2	
2	813-0110	6	Screw, Machine - Round Head (#10-32 x 2)
3	854-0010	6	Washer, Lock - IT (#10)
4	302-0235	3	Clamp, Upper
5	302-0236	3	Clamp, Lower
6	302-0253	6	Shim

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
CURRENT TRANSFORMER (Select Size as Required)			
7	302-0117	3	Ratio 50/5, 3 VA
	302-0076	3	Ratio 75/5, 2 VA
	302-0078	3	Ratio 100/5, 2 VA
	302-0079	3	Ratio 150/5, 1 VA
	302-0106	3	Ratio 200/5, 1 VA
	302-0209	3	Ratio 230/5, 1 VA
	302-0107	3	Ratio 300/5, 1 VA
8	813-0100	6	Screw, Machine - Round Head (#10-32 x 1-2")
	526-0008	6	Washer, Flat (13/64" ID x 7/16" OD x 1/32" Thk)
9	856-0003	6	Washer, Lock - EIT (#10)
10	870-0053	6	Nut, Hex (#10-32)
11	870-0053	6	
12	302-0952	3	CURRENT TRANSFORMER (Select Size as Required)
	302-0864	3	Ratio 75/5, 2 VA
	302-0865	3	Ratio 150/5, 2 VA
	302-0866	3	Ratio 200/5, 2 VA
	302-0608	3	Ratio 250/5, 2 VA
	302-0547	3	Ratio 400/5, 2 VA
	302-0471	3	Ratio 500/5, 2 VA
13	302-0729	1	Bracket, Mounting - Transformer
14	302-0764	1	Bracket, Mounting - Transformer

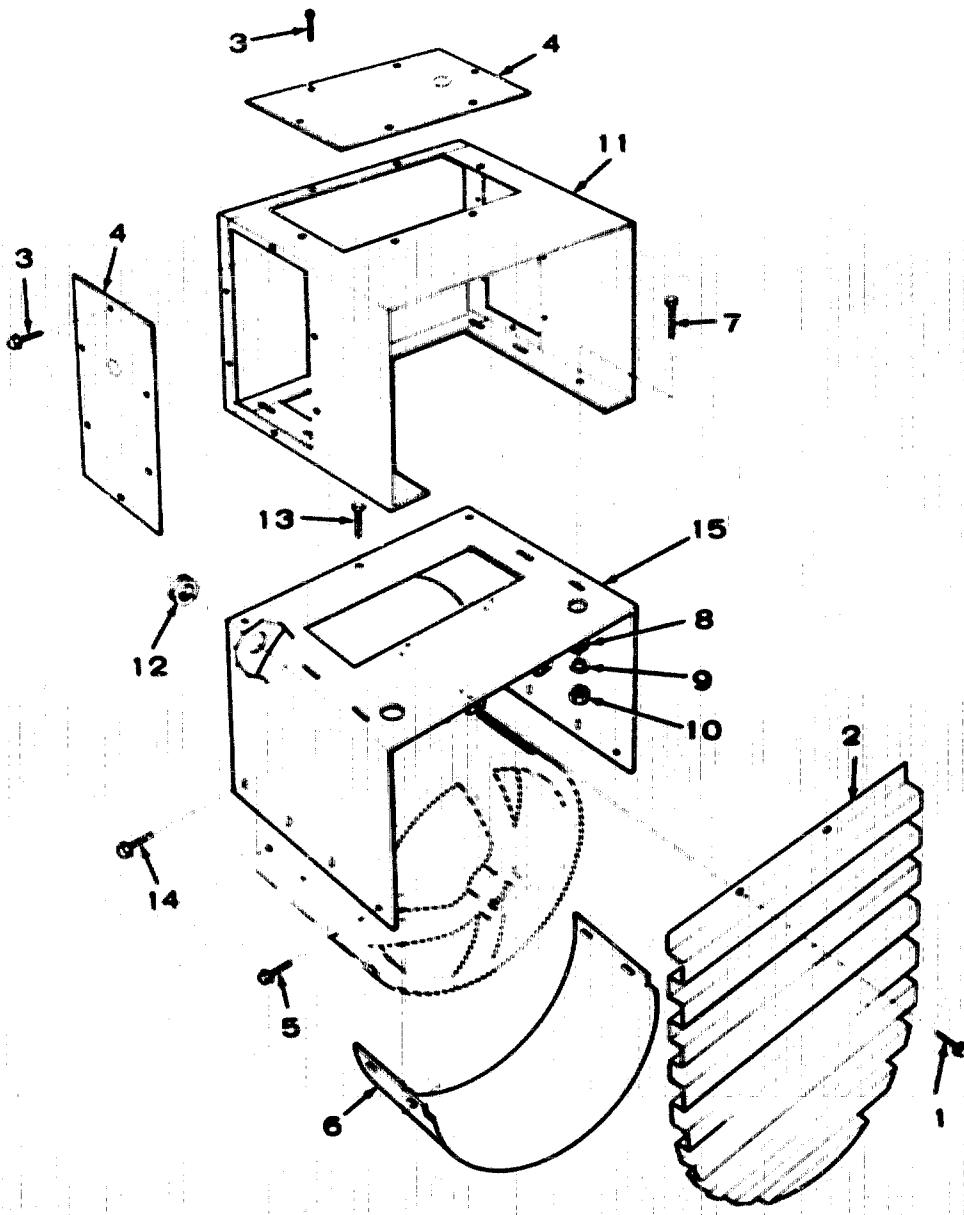
CONTROL HEATER



SC-1156

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	335-0110	1	Cable, Electrical (3 Wire)
2	812-0090	2	Screw, Machine - Round Head (#6-32 x 2-1/4")
3	860-0006	4	Nut, Hex (#6-32)
4	856-0001	2	Washer, Lock - EIT (#6)
5	301-1886	1	Cover, Thermostat
6	309-0128	1	Thermostat - Adjustable
7	800-0007	2	Screw, Cap - Hex Head (1/4-20 x 1")
8	862-0001	2	Nut, Hex (1/4-20)
9	850-0040	2	Washer, Lock - Spring (1/4)
10	526-0052	2	Washer, Flat (17/64" ID x 9/16" OD x 1/16" Thk)
11	862-0015	4	Nut, Hex (5/16-18) - Used As Spacers
12	333-0151	1	Heater - 75 Watt, 120 VAC; 300 Watt, 240 VAC

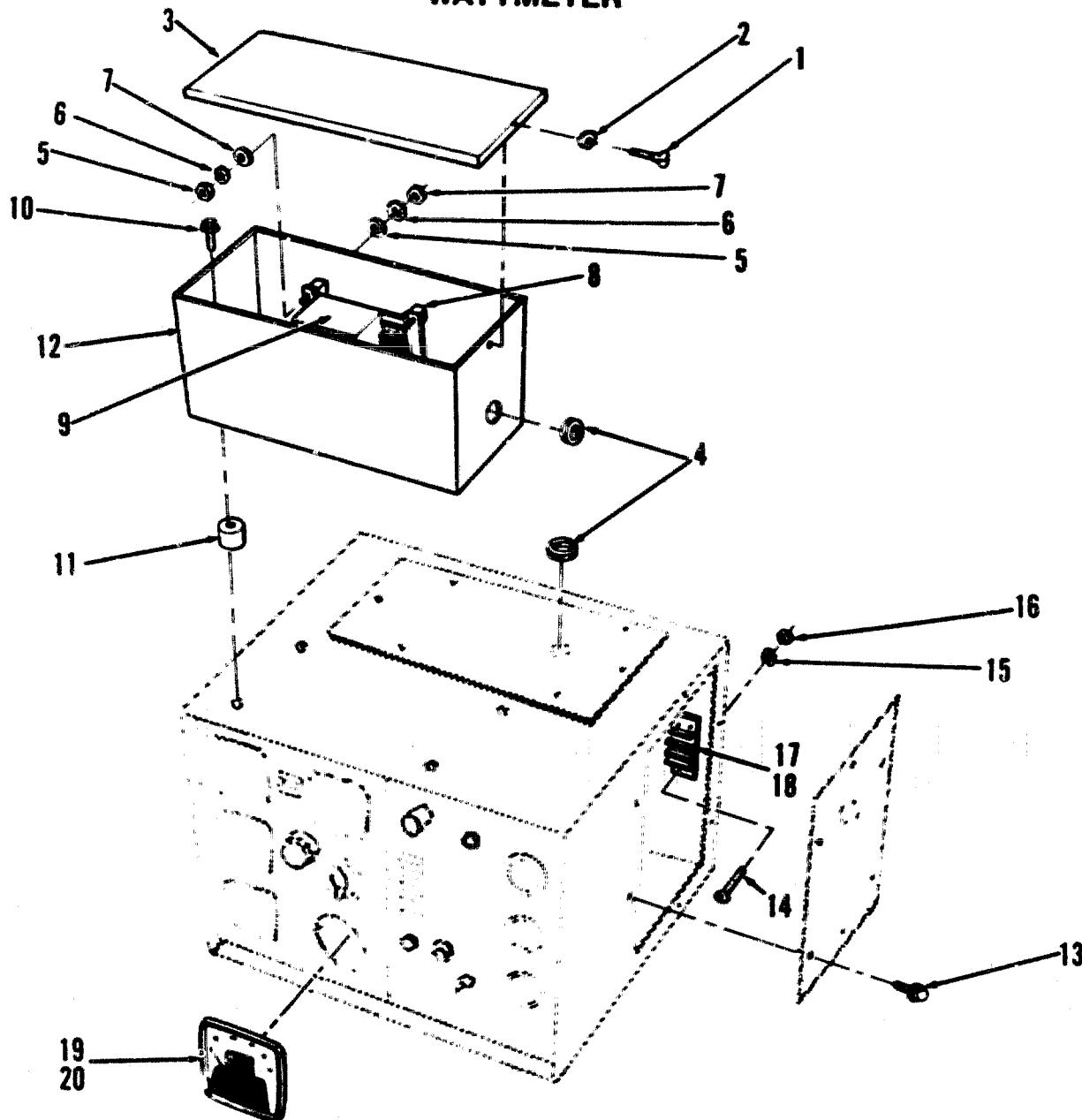
CONTROL HOUSING



M-1180

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	821-0010	8	Screw Self-locking - Hex Washer Head (1/4-20 x 1/2")	8	856-0006	1	Washer, Lock - EIT (1/4")
2	234-0370	1	Grill, Air - Generator Inlet	9	526-0018	5	Washer, Flat (17/64" ID x 5/8" OD x 1/16" Thk)
3	815-0350	18	Screw, Tapping - Hex Washer Head (#10-32 x 3/8")	10	870-0212	6	Nut, Hex (1/4-20)
4	301-3156	3	Panel, Access	11	301-3155	1	Housing, Control Box
5	821-0010	4	Screw, Self-locking - Hex Washer Head (1/4-20 x 1/2")	12	508-0203	1	Bushing, Cable - Nylon
6	234-0361	1	Wrapper, End Bell	13	821-0010	1	Screw, Self-locking - Hex Washer Head (1/4-20 x 1/2")
7	821-0018	6	Screw, Self-locking - Hex Washer Head (1/4-20 x 5/8")	14	821-0014	8	Screw, Self-locking - Hex Washer Head (5/16-18 x 1/2")
				15	301-3154	1	Saddle, Control Box

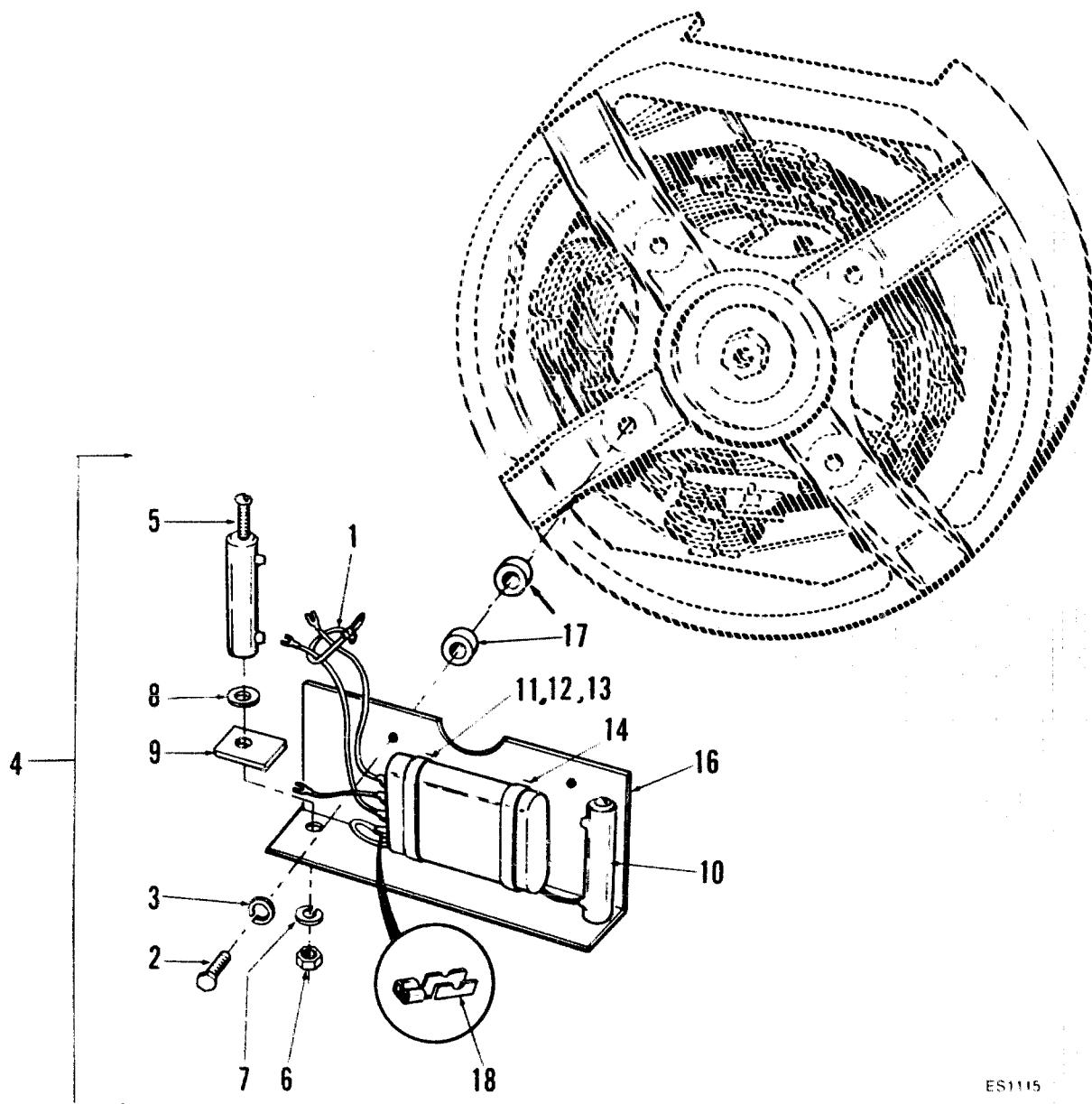
WATTMETER



SC1157

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	815-0026	2	Screw, Machine - Truss Head (#10-32 x 3/8")	15	853-0003	4	Washer, Lock - External Tooth (#8)
2	853-0008	2	Washer, Lock - External Tooth (#10)	16	860-0006	4	Nut, Hex (#6-32)
3	301-3476	1	Cover - Transducer Box	17	332-0609	1	Terminal, Strip
4	508-0001	2	Grommet, Rubber (1-1/6" OD)	18	332-0610	1	Marker, Strip
5	860-0008	8	Nut, Hex (#8-32)	19	302-1102	1	Wattmeter (Less Replaceable Dial)
6	853-0005	8	Washer, Lock - External Tooth (#8)	20	DIAL, WATTMETER (Select as Required)		
7	526-0003	6	Washer, Flat (11/64" ID x 3/8" OD x 1/32" Thk)	302-1103	1	Scale 0-35 kW	
8	402-0354	4	Mount, Vibration	302-1104	1	Scale 0-50 kW	
9	TRANSDUCER (Select as Required)			302-1105	1	Scale 0-70 kW	
302-1082	1	60 Hertz		302-1106	1	Scale 0-90 kW	
302-1083	1	50 Hertz		302-1107	1	Scale 0-115 kW	
10	821-0014	8	Screw, Self-locking - Hex Washer Head (5/16-18 x 1/2")	302-1108	1	Scale 0-160 kW	
11	402-0070	4	Mount, Vibration	302-1109	1	Scale 0-180 kW	
12	301-3477	1	Box, Transducer	302-1110	1	Scale 0-200 kW	
13	815-0350	6	Screw, Tapping - Hex Washer Head (#10-32 x 3/8")	302-1115	1	Scale 0-250 kW	
14	812-0063	4	Screw, Machine - Round Head (#6-32 x 1/2")	302-1116	1	Scale 0-300 kW	
				302-1117	1	Scale 0-350 kW	
				302-1118	1	Scale 0-400 kW	
				302-1119	1	Scale 0-450 kW	
				302-1120	1	Scale 0-550 kW	
				302-1121	1	Scale 0-650 kW	
				302-1122	1	Scale 0-750 kW	

VOLTAGE REGULATOR FILTER



ES1115

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
KIT. FILTER - VOLTAGE REGULATOR (Includes Parts Marked *)							
232-2694	1	Used on Sets with End Bell Mounted Voltage Regulator	7 850-0040	2	Washer, Lock - Spring (1/4")		
232-2695	1	Used on Sets with Voltage Regulator Mounted in Control Box	8 304-0427	4	Washer, Centering (1/4")		
1 332-0941	5	Tie, Cable	9 304-0292	2	Insulator		
2 800-0003	2	Screw, Cap - Hex Head (1/4-20 x 1/2")	10 354-0025	2	Resistor, Fixed, Wire Wound (10-Ohm, 100 Watt)		
3 850-0040	2	'Washer, Lock - Spring (1/4")	11 813-0098	4	Screw, Machine - Round Head (#10-32 x 3/8")		
4 *FILTER ASSEMBLY (Includes all Parts Except as Indicated)	REF	Part of Kit 232-2694	12 870-0053	4	Nut, Hex (#10-32)		
232-2219	REF	Part of Kit 232-2695	13 850-0030	4	Washer, Lock - Spring (#10)		
232-2692	REF		14 312-0189	2	Bracket, Mounting - Capacitor		
5 812-0165	2	Screw, Machine - Round Head (1/4-20 x 4-1/2")	15 312-0188	1	Capacitor, Fixed - 15 MFD, 440 VAC		
6 862-0001	2	Nut, Hex (1/4-20)	16 232-2210	1	Bracket, Mounting		
			17 526-0018	15	Washer, Flat(1/4")		
			18 TERMINALS (Select as Required)				
			332-1279	8	Insulated 14-16 AWG		
			332-0529	4	Lug 14-16 AWG		

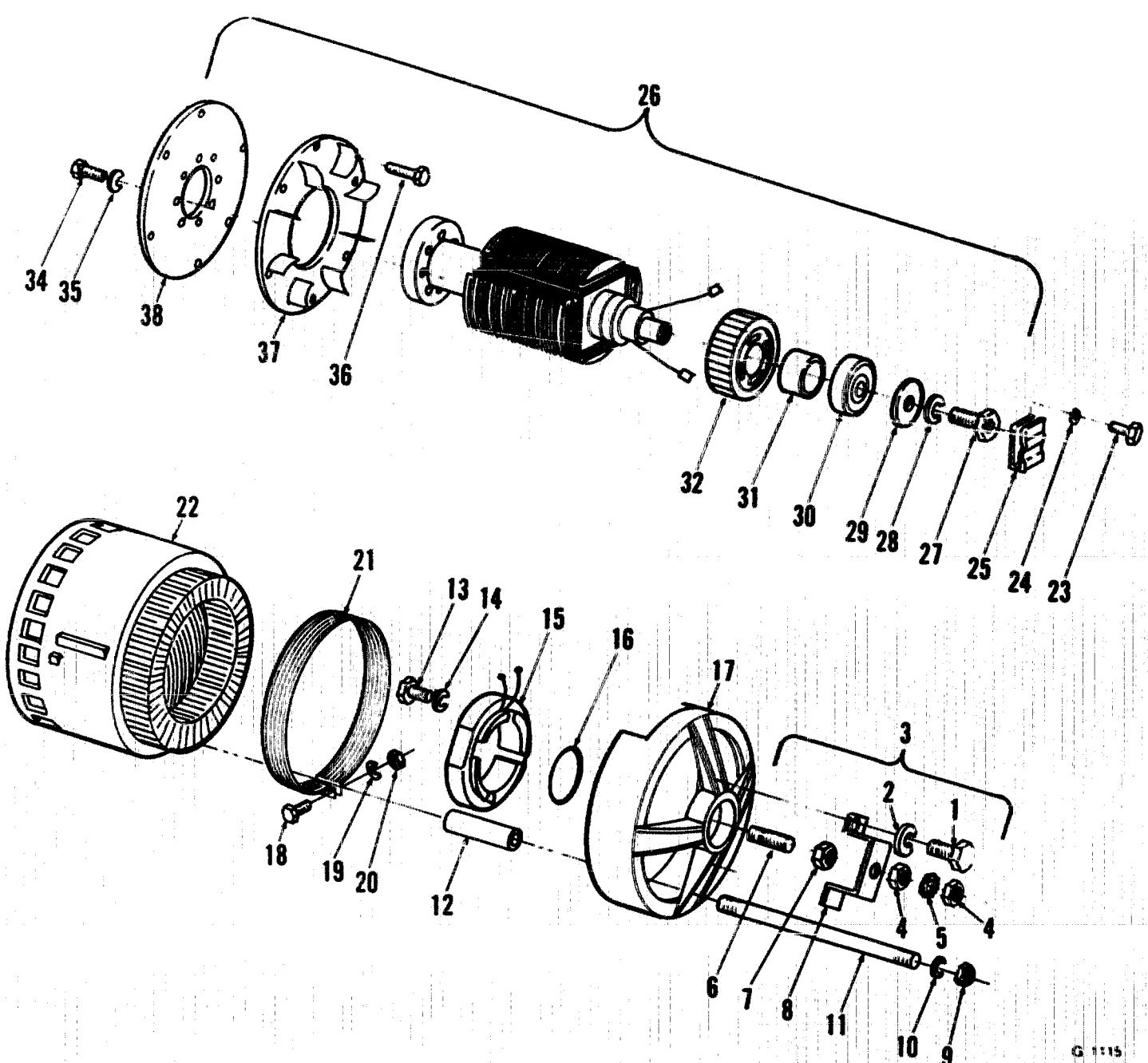
* Parts included in kits

Generator Section

Table of Contents

ILLUSTRATION		PAGE
Generator Assembly.....		F2
Voltage Suppressor Assembly.....		F4
Excited Rotor.....		F5
Generator Heater.....		F6

**GENERATOR ASSEMBLY - BRUSHLESS TYPE
USED WITH REMOTE VOLTAGE REGULATOR**



F2

GENERATOR ASSEMBLY - BRUSHLESS TYPE USED WITH REMOTE VOLTAGE REGULATOR

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	800-0003	2	Screw, Cap - Hex Head (1/4-20 x 1/2") (1/4-20 x 1/2")	26	ROTOR ASSEMBLY, GENERATOR (Includes Parts Marked*) 50 HERTZ SETS		
2	850-0040	2	Washer, Lock - Spring (1/4")	201-2666		1	Code 515
3	150-1456	1	Contact Assembly - Overspeed Switch (Includes Parts Marked +)	201-2669		1	tCode 515 (Extended Stack) 60 HERTZ SETS
4	862-0001	2	+Nut, Hex (1/4-20)	201-2669		1	Code 3
5	853-0013	1	+Washer, Lock - ET (1/4")	201-2687		1	tCode 3 (Environmental Protected)
6	150-0723	1	+Contact, Electrical	201-2666		1	Codes 6D, 7, 9X, 15
7	870-0250	1	+Nut, Insulated	201-2669		1	tCode 15 (Extended Stack)
8	150-1356	1	+Bracket, Mounting - Contact	201-2684		1	£Code 15 (Environmental Protected)
9	862-0011	4	Nut, hex - Grade 8 (3/8-16)	201-2687		1	t£Code 15 (Extended Stack and Environmental Protected)
10	850-0050	4	Washer, Lock - Spring (3/8")	27	800-0513	1	*Screw, Cap - Hex Head Modified with 3/8-16 Tapped Center Hole (3/4-10 x 1-1/2")
11	STUD (Select as Required)			28	850-0079	1	*Washer, Lock - Spring (3/4")
	520-0718	4	3/8-16 UNC x 14-11/16" Lg	29	526-0238	1	*Washer, Flat - Steel Alloy (13/16" ID x 2" OD x 3/16" Thk)
	520-0721	4	3/8-16 UNC x 16-11/32" Lg	30	510-0101	1	*Bearing, Ball
12	503-0611	4	Hose, Rubber	31	232-2102	1	*Spacer, Sleeve
13	800-0009	4	Screw, Cap - Hex Head (1/4-20 x 1-1/2")	32	*ROTOR ASSEMBLY, EXCITER (See Separate Group for Components)		
14	850-0040	4	Washer, Lock - Spring (1/4")	201-1739	1	Standard	
15	STATOR, EXCITER (Select as Required)			201-1845	1	£Environmental Protected	
	220-2353	1	Standard	33	515-0145	1	*Key, Machine (1/4" x 1/4" x 7/8")
	220-1774	1	£Environmental Protected	34	*BOLT, PLACE - HEX HEAD, GRADE 8 (Select as Required)		
16	509-0125	1	Seal, Oil - "O" Ring	805-0033	8	5/8-11 x 1"	
17	211-0185	1	End Bell, Generator	805-0035	8	5/8-11 x 1-1/2"	
18	800-0008	2	Screw, Cap - Hex Head (1/4-20 x 1-1/4")	35	526-0259	8	*Washer, Flat - Hardened Steel (11/16" ID x 1-3/8" OD x 7/64" Thk)
19	850-0040	2	Washer, Lock - Spring (1/4")	36	*BOLT, PLACE - HEX HEAD, GRADE 8 (Select as Required)		
20	862-0001	2	Nut, Hex (1/4-20)	805-0018	8	3/8-16 x 1"	
21	234-0368	1	Screen, Air - Generator	805-0019	8	3/8-16 x 1-1/4"	
22	STATOR ASSEMBLY, GENERATOR			37	205-0089	1	*Fan, Generator
	50 HERTZ SETS			38	232-2078	1	*Disk Drive - Generator
	220-1994	1	Code 515				
	220-1997		tCode 515 (Extended Stack)				
	60 HERTZ SETS						
	220-1552	1	Code 3				
	220-1845	1	£Code 3 (Environmental Protected)				
	220-2621	1	Code 6D				
	220-2459	1	Code 7				
	220-1599	1	Code 9X				
	220-1451	1	Code 15				
	220-1454	1	tCode 15 (Extended Stack)				
	220-1783	1	£Code 15 (Environmental Protected)				
	220-1786	1	t£Code 15 (Extended Stack and (Environmental Protected)				
23	800-0048	1	Screw, Cap - Hex Head (3/8-16 x 3/4")				
24	856-0010	1	Washer, Lock - EIT (3/8")				
25	150-0717	1	Switch, Overspeed				

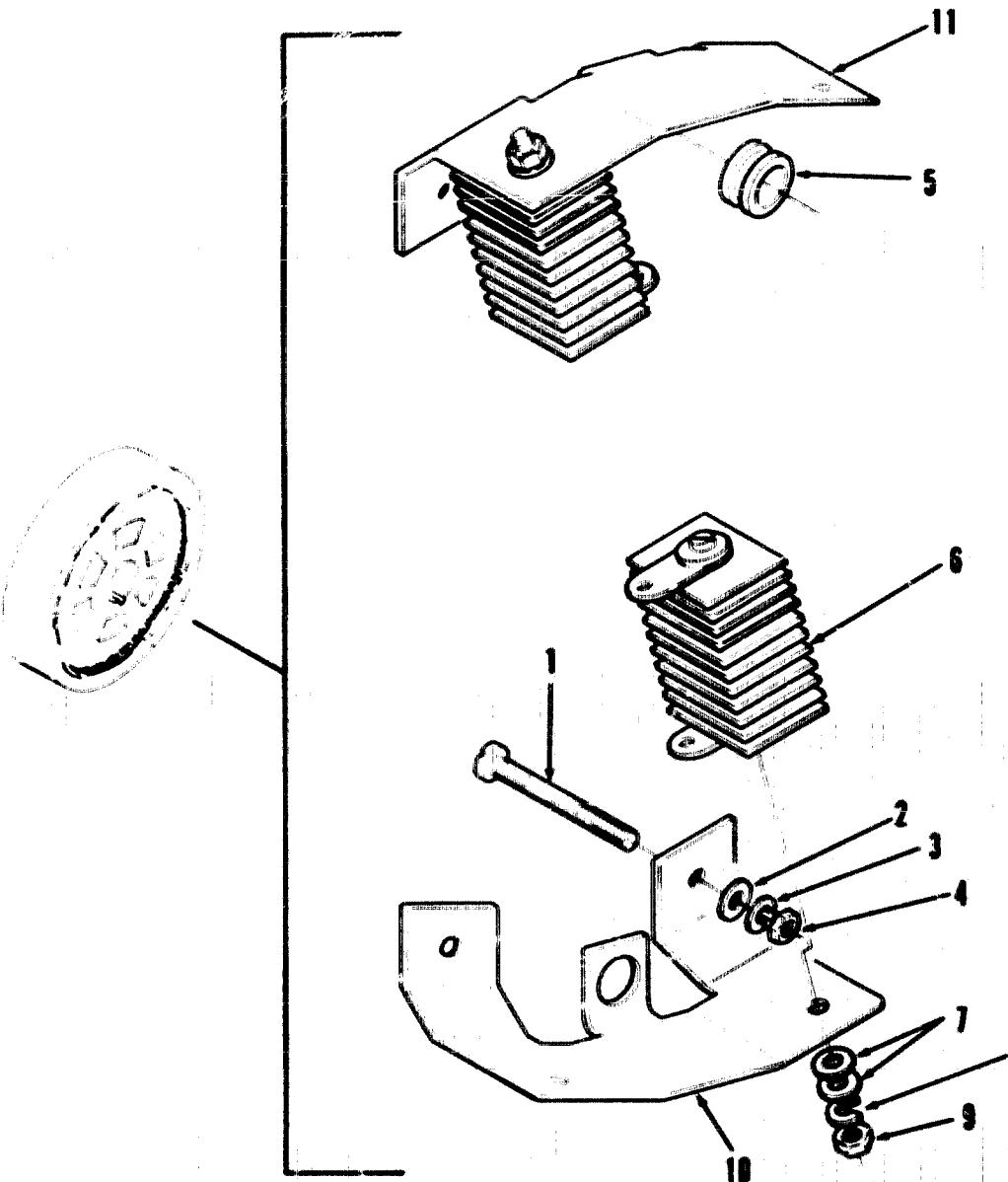
- - Parts Included in Overspeed Switch Assembly.

* - Parts Included in Generator Rotor Assembly.

t - Extended Stack type assemblies that are used on sets having full power output on both single and three phase hookups. Both phases carry same kW and kVA ratings.

£ - Environmental protected assemblies or parts which are coated with epoxy and are for use in high humidity areas.

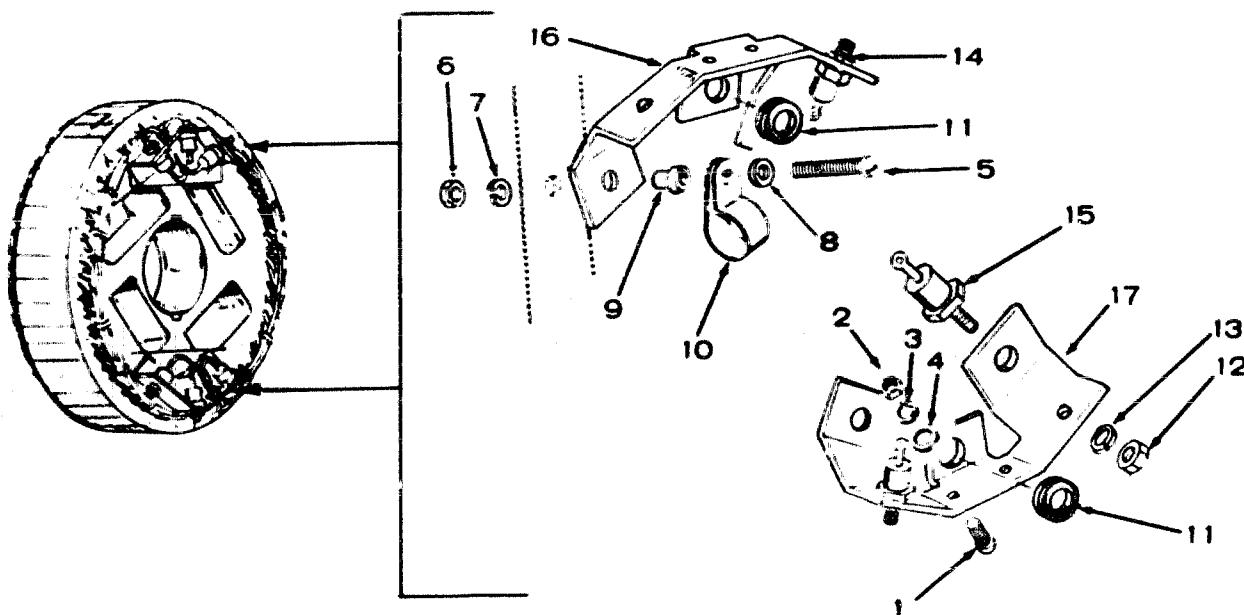
VOLTAGE SUPPRESSOR ASSEMBLY



ES-1285-1

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
	232-2444	1	Voltage Suppressor Assembly (Includes Items 5 thru 11)	6	305-0526	1	Set, Voltage Suppressor (Matched Pair) Includes Items 7 thru 9
ATTACHING PARTS FOR ASSEMBLY							
1	813-0112	4	Screw, Machine - Round Head (#10-32 x 2-1/2")	7	526-0140	4	ATTACHING PARTS FOR SUPPRESSORS
2	526-0140	4	Washer, Flat (7/32" ID x 3/8" OD x 3/64" Thk)	8	850-0030	4	Washer, Flat (7/32" ID x 3/8" OD x 3/64" Thk)
3	850-0030	4	Washer, Lock - Spring (#10)	9	870-0053	4	Washer, Lock - Spring (#10)
4	870-0053	4	Nut, Hex (#10-32)	10	363-0054	1	Nut, Hex (#10-32)
5	508-0093	2	Grommet, Rubber	11	363-0055	1	Heatsink - Positive
							Heatsink - Negative

EXCITER ROTOR

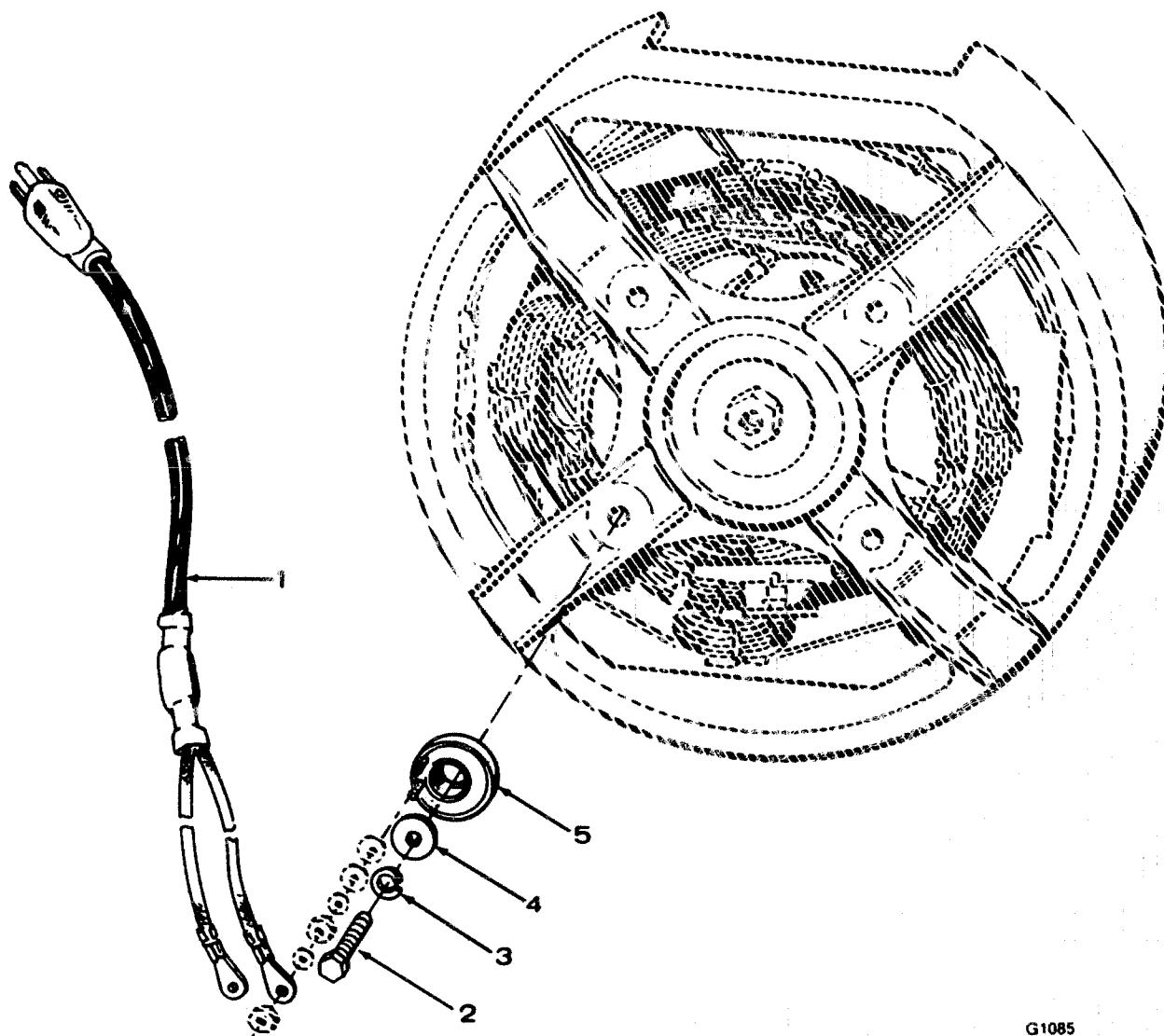


G-1030

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
ROTOR ASSEMBLY, EXCITER (Includes Parts Marked *)			
	201-1739	1	Standard
	201-1845	1	Environmental Protected (Epoxyed)
1	813-0100	2	Screw, Machine - Round Head (#10-32 x 1/2")
2	870-0053	2	Nut, Hex (#10-32)
3	850-0030	2	Washer, Lock - Spring (#10)
4	526-0008	2	Washer, Flat (13/64" ID x 7/16" OD x 1/32" Thk)
5	813-0110	4	*Screw, Machine - Round Head (#10-32 x 2")
6	870-0053	4	*Nut, Hex (#10-32)
7	850-0030	4	*Washer, Lock - Spring (#10)
8	526-0009	4	*Washer, Flat (7/32" ID x 1/2" OD x 1/16" Thk)
9	508-0187	4	*Spacer, Stepped
10	332-0050	2	*Clamp, Loop
11	508-0093	2	*Grommet, Rubber
12	870-0053	6	*Nut, Hex (#10-32)
13	850-0030	6	*Washer, Lock - Spring (#10)
14	*DIODE, RECTIFIER - POSITIVE (CR1, CR2, CR3)		
	358-0016	3	Standard
	358-0044	3	Environmental Protected (Epoxyed)
15	*DIODE, RECTIFIER - NEGATIVE (CR4, CR5, CR6)		
	358-0015	3	Standard
	358-0043	3	Environmental Protected (Epoxyed)
16	363-0054	1	*Heat, Sink - Positive Diodes
17	363-0055	1	*Heat, Sink - Negative Diodes

* - Parts included in Exciter Rotor Assembly

GENERATOR HEATER



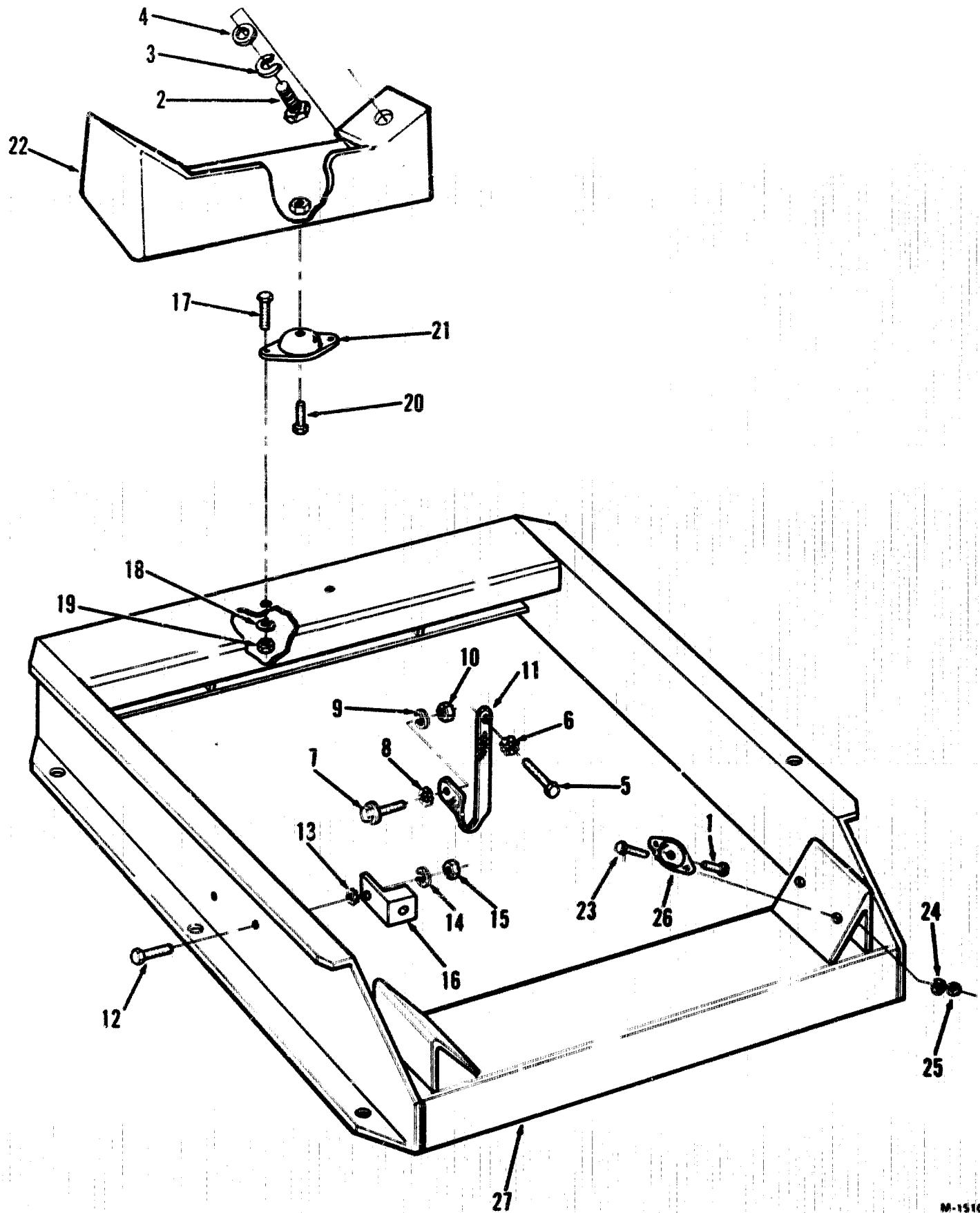
REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
HEATER, GENERATOR			
		1	120 Volt
		1	240 Volt
1	CABLE ASSEMBLY (Includes Thermostat)		
	335-0146	1	120 Volt
	335-0147	1	240 Volt
2	800-0004	1	Screw, Cap - Hex Head (1/4-20 x 5/8")
3	850-0038	1	Washer, Lock - Spring (1/4")
4	526-0158	1	Washer, Flat (17/64" ID 1" OD x 1/8" Thk)
5	HEATER, ELECTRICAL		
	333-0059	1	120 Volt, 125 Watt
	333-0192	1	240 Volt, 200 Watt

Chassis-Housing Section

Table of Contents

ILLUSTRATION		PAGE
Chassis.....		G2
Circuit Breaker.....		G4

CHASSIS

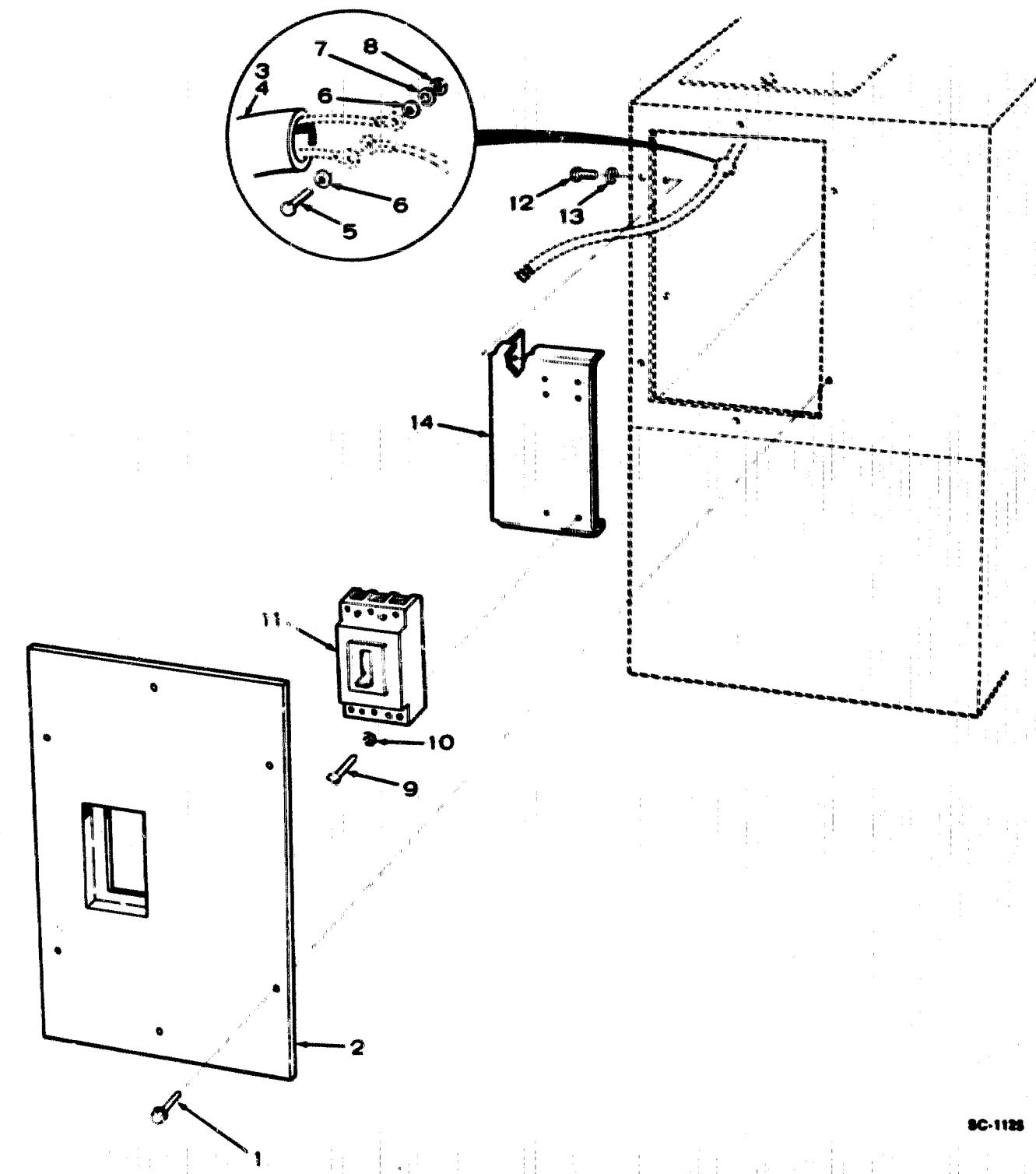


M-1510

CHASSIS

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	800-0520	2	Screw, Cap - Hex Head (3/4-10 x 1")	13	856-0008	1	Washer, Lock - External/Internal Tooth (5/16")
2	800-0050	2	Screw, Cap - Hex Head (3/8-16 x 1")	14	850-0045	1	Washer, Lock - Spring (5/16")
3	850-0050	2	Washer, Lock - Spring (3/8")	15	862-0015	1	Nut, Hex (5/16-18)
4	526-0026	2	Washer, Flat	16	332-1473	1	Terminal, Lug
5	800-0072	1	Screw, Cap - Hex Head (7/16-14 x 1-1/4")	17	800-0090	2	Screw Cap - Hex Head (1/2-13 x 1")
6	856-0012	1	Washer, Lock - External/Internal Tooth (7/16")	18	850-0060	2	Washer, Lock - Spring (1/2")
7	800-0091	1	Screw, Cap - Hex Head (1/2-13 x 1-1/4")	19	862-0016	2	Nut, Hex (1/2-13)
8	856-0013	1	Washer, Lock - External/Internal Tooth (1/2")	20	800-0520	1	Screw, Cap - Hex Head (3/4-10 x 1")
9	850-0060	1	Washer, Lock - Spring (1/2")	21	402-0030	1	Mount, Vibration - Engine
10	862-0016	1	Nut, Hex (1/2-13)	22	403-0910	1	Support, Mounting - Engine
11	337-0090	1	Strap, Electrical	23	800-0071	4	Screw, Cap - Hex Head (7/16-14 x 1")
12	800-0028	1	Screw, Cap - Hex Head (5/16-18 x 1")	24	850-0055	4	Washer, Lock - Spring (7/16")
				25	862-0004	4	Nut, Hex (7/16-14)
				26	402-0030	2	Mount, Vibration - Generator
				27	403-0917	1	Chassis

CIRCUIT BREAKER



SC-1128

G4

CIRCUIT BREAKER

REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION	REF. NO.	PART NO.	QTY. USED	PART DESCRIPTION
1	815-0350	6	Screw, Tapping - Hex Washer Head (#10-32 x 3/8")	11	CIRCUIT BREAKER (Select as Required)		
2	301-3192	1	Panel, Cover - Circuit Breaker	320-0415		1	40 AMP, 3 PH, 347/600 VAC
3	SLEEVING, INSULATION - SHRINKABLE (Select as Required)			320-0413		1	50 AMP, 3 PH, 277/480 VAC
	898-0863		3/4" ID	320-0384		1	60 AMP, 3 PH, 200/346 - 220/380 VAC
	898-0865		1" ID	320-0416		1	60 AMP, 3 PH, 347/600 VAC
	898-0875		1-1/2" ID	320-0414		1	70 AMP, 3 PH, 277/480 VAC
	898-0869		2" ID	320-0417		1	70 AMP, 3 PH, 347/600 VAC
4	SLEEVING, INSULATION - FIBERGLASS (Select as Required)			320-0411		1	90 AMP, 3 PH, 120/240 VAC
	898-0974		3/4" ID	320-0379		1	90 AMP, 3 PH, 200/346 - 220/380 - 277/480 VAC
	898-0976		1" ID	320-0418		1	90 AMP, 3 PH, 347/600 VAC
5	800-0028	5	Screw, Cap - Hex Head (5/16-18 x 1")	320-0412		1	100 AMP, 3 PH, 120/208 VAC
6	526-0022	10	Washer, Flat (21/64" ID x 9/16" OD x 1/16" Thk)	320-0380		1	100 AMP, 3 PH, 200/346 - 220/380 - 277/480 VAC
7	850-0045	5	Washer, Lock - Spring (5/16")	320-0771		1	100 AMP, 3 PH, 127/220 VAC
8	862-0015	5	Nut, Hex (5/16-18)				with 24 VDC shunt trip and AUX contacts
9	812-0094	4	Screw, Machine - Round Head (#8-32 x 3-5/8")				125 AMP
10	850-0025	4	Washer, Lock - Spring (#8)	320-0419		1	125 AMP, 3 PH, 200/346 - 220/380 VAC
				320-0346		1	150 AMP
				320-0425		1	150 Amp, 3 PH, 120/208 - 120/240 VAC
				320-0772		1	150 AMP, 3 PH, 200/346 VAC
							150 AMP, 3 PH, 127/220 VAC
							with 12 VDC shunt trip and AUX contacts
				320-0344		1	175 AMP
				320-0347		1	175 AMP, 1 PH, 120/240 VAC
				320-0773		1	175 AMP, 3 PH, 120/208 - 120/240 VAC
							175 AMP, 3 PH, 127/220 VAC
				320-0344		1	175 AMP, 3 PH, 120/208 - 120/240 VAC
				320-0347		1	175 AMP, 3 PH, 120/208 - 120/240 VAC
				320-0773		1	175 AMP, 3 PH, 127/220 VAC
							with 12 VDC shunt trip and AUX contacts
				320-0348		1	200 AMP
							200 AMP, 3 PH, 120/208 - 120/240 VAC
				320-0359		1	225 AMP
				320-0349		1	225 AMP, 1 PH, 120/240 VAC
12	800-0003	2	Screw, Cap - Hex Head (1/4-20 x 1/2")				225 AMP, 3 PH, 120/208 VAC
13	850-0040	2	Washer, Lock - Spring (1/4")				Screw, Cap - Hex Head
14	301-3197	1	Bracket, Mounting - Circuit Breaker				(1/4-20 x 1/2")

NOTE - For Circuit Breakers with special features like Shunt Trip, AUX Contacts etc., not listed above - Contact your nearest Onan Parts Center and provide your Model, Serial and Specification numbers. Also provide any identification numbers or rating from the Circuit Breaker to be replaced.